MOTT MACDONALD

Uzbekistan: Cotton Farming Project

Volume II - Impact Assessment

3 April 2020

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List of Abbreviations

Abbreviation		Description
ACs	–	Affected communities
AIS	–	Alien Invasive Species
ECHA	–	The European Chemicals Agency
APC	–	Approximate permissible concentrations
AoI	–	Area of Influence
BAT	–	Best available techniques
BCI	–	Better Cotton Initiative
CEMP	–	Construction Environmental Management Plan
CO	–	Carbon monoxide
Company	–	FE “Indorama Agro” LLC
Consultant	–	Mott MacDonald Limited and Ecostandart Expert
CSR	–	Corporate Social Responsibility
CTMP	–	Construction Traffic Management Plan
DEMP	–	Decommissioning Environmental Management Plan
GDP	–	Gross Domestic Product
GHG	–	Greenhouse gas
GII	–	Gender Inequality Index
Goskomekologiya	–	State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection
GoU	–	Government of Uzbekistan
E&S	–	Environment and social
EBRD	–	European Bank for Reconstruction and Development
EHS	–	Environmental, health and safety
EIA	–	Environmental impact assessment
EPRP	–	Emergency Preparedness and Response Plan
ESIA	–	Environmental and social impact assessment
ESMP	–	Environmental and Social Management Plan
ESP	–	EBRD’s Environmental and Social Policy
EU	–	European Union
FGDs	–	Focus Group Discussions
Ha	–	Hectare
HMZ	–	Hydro Module Zones
IARC	–	World Health Organization's International Agency for Research on Cancer
IBAs	–	Important Bird Areas
IFC	–	International Financial Corporation
IFIs	–	International Financial Organisations
ILO	–	International Labour Organization
International Lenders	–	European Bank for Reconstruction and Development and International Financial Corporation
IP	–	Indigenous Peoples
IPPC	–	Integrated pollution prevention and control
ISBA	–	Irrigation System Basin Authorities
Law on Environmental Expertise	–	Law of the Republic of Uzbekistan No.73-II3 of 14.09.2017 "On Environmental Expertise"
LLA	–	Land Lease Agreement
LRP	–	Livelihood Restoration Plan

Abbreviation		Description
MML	–	Mott MacDonald Limited (UK)
MPC	–	Maximum permissible concentrations
MSDS	–	Material Safety Data Sheet
NGOs	–	Non-governmental organisations
NTS	–	Non-Technical Summary
PER	–	Public environmental review
PPE	–	Personal Protective Equipment
Project	–	Cotton Farming Project in Uzbekistan
PSs	–	IFC Performance Standards
PTL	–	Power transmission line
PU	–	Producer Unit
RAP	–	Resettlement Action Plan
RoU	–	Republic of Uzbekistan
RPF	-	Resettlement Policy Framework
SCSS	–	Sustainable Cotton Standard System
SEC	–	Statement on Environmental Consequences
SEE	–	State Environmental Expertise
SEE Degree	–	Decree of the Cabinet of Ministers of the Republic of Uzbekistan of 22.11.2018 No.949 "On Approval of the "Regulation on State Environmental Expertise in the Republic of Uzbekistan"
SEP	–	Stakeholder Engagement Plan
SIA	–	Social impact assessment
Sponsor	–	Indorama Corporation Pte. Ltd.
SUE	–	State Unitary Enterprise
SWMP	–	Site Waste Management Plan
UNDP	–	United Nations Development Programme
UZS	–	Uzbek Soums
Uzhydromet	–	Centre of Hydrometeorological Service at Ministry of Emergency Situations of the Republic of Uzbekistan
WUA	–	Water Users Association
ZoI	–	Zone of Influence

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Executive summary

Purpose of this Document

This document is Volume II – Impact Assessment of the Environmental and Social Impact Assessment (**ESIA**) Report prepared for the large-scale cotton farming project (the **Project**) being implemented by FE "Indorama Agro" LLC (the **Company**) in the Republic of Uzbekistan (**RoU**).

This document provides a detailed overview of the existing and proposed operations, parties involved in the Project development, describes what are the needs for the Project and why the choice of technology is most appropriate. It also assesses the environmental and social impacts of the Project in accordance with the defined assessment approach and methodology.

The purpose of this volume of the ESIA Report is to evaluate and promote the Project's compliance with applicable national and international requirements including to stakeholder engagement and information disclosure which are considered in detail in this document, and which the Project is to be assessed against.

By fulfilling this purpose, the ESIA procedure does the following:

- Identifies and assesses the potential environmental and social (**E&S**) impacts that the Project may have on the environment, communities, individuals and groups of individuals within its Area of Influence (**AoI**)
- Avoids, or where avoidance is not possible, minimises, mitigates or compensates for adverse impacts on the environment, communities, individuals and groups
- Ensures that affected communities (**ACs**) and groups of affected individuals are appropriately engaged on issues that could potentially affect them
- Promotes improved social and environmental performance through the effective use of management systems.

Other ESIA documents that are produced at the ESIA Scoping Phase in support of the financing requirements of the Project, and that should be read in conjunction with this Impact Assessment Volume, include:

- ESIA Scoping Report (issued in September 2019) – describes initial findings of the ESIA study and the assessment scope
- Stakeholder Engagement Plan (**SEP**) – identifies the key Project stakeholders, engagement programme, SEP updating and reporting requirements and sets out the Project grievance mechanism.

Structure of the ESIA Report

The ESIA Report is comprised of four volumes organised as follows:

- Volume I: Non-Technical Summary;
- **Volume II: Impact Assessment (this volume)**
  - Executive Summary
  - Chapter 1 – Project Description
  - Chapter 2 – Legal and Institutional Framework
  - Chapter 3 – Assessment Scope and Methodology
  - Chapter 4 – Information Disclosure, Consultation and Participation
  - Chapter 5 – Social Impact Assessment, Management and Monitoring
  - Chapter 6 – Environmental Impact Assessment, Management and Monitoring

  - Chapter 7 – Glossary of Terms
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Project Background

The Government of Uzbekistan (**GoU**) has recently launched a programme for creation of cotton clusters and optimisation of land use for direct and/or contracted cotton farming and based on last recorded data has approved a total of 66 cotton clusters with a total land area of 660,000 hectares (ha).

Cotton clusters are considered by the GoU and a wider international community as a possible solution towards eradicating forced labour and child labour in cotton farming and production. There is no formal definition of the term “cotton cluster”, but it describes a structure whereby the government allocates a defined area to a private investor who in return commits to growing cotton (either by direct farming and/or by contracts with existing/new farmers) and to establishing processing and/or manufacturing facilities for end use of cotton within the country. The main objectives are to reduce the role of the government in cotton production, create jobs and position Uzbekistan as an exporter of textiles and garments rather than raw cotton.

To respond to the GoU initiative, Indorama Corporation Pte. Ltd. (the **Sponsor**) decided to set up a cotton cluster in Uzbekistan and start growing its own cotton (with rotation crops). The cotton cluster of Indorama includes:

- The existing spinning facility in Kokand commissioned in 2010 in Fergana region of Uzbekistan and operated by FE “Indorama Kokand Textile” JSC (an indirect subsidiary of the Sponsor**)**
- The cotton farming project in Kashkadarya and Syrdarya regions of Uzbekistan to grow cotton for captive consumption at the spinning plant in Kokand and for any future spinning capacity (the Project)

The Sponsor established a project company (**FE “Indorama Agro” LLC or the Company**) in Uzbekistan to develop and implement the cotton farming scheme for the cluster. The Sponsor intends to use 100% of the cotton farmed by the Project in the spinning facility in Kokand and in any other new capacity created by the Sponsor or added by FE “Indorama Kokand Textile” JSC to produce cotton yarn.

The Sponsor, has been working closely for three years with IFC’s agribusiness advisory team and continues to do so, has developed a structured approach towards the cotton farming project to:

- Prevent the use of forced labour in cotton farming
- Increase production and water usage efficiency
- Enhance sustainability of the cotton sector in Uzbekistan
- Share knowledge and know-how in cotton farming.

Project Description and Components

The Project will establish:

- Cotton farming schemes to farm cotton with rotation crops
- Ginning facilities to process raw cotton and produce cotton fibre and cotton seeds
- Seven farm depots with warehouses for fertilisers and chemicals, storage facilities for harvested cotton and wheat, workshops and machinery parking yards including all required administrative infrastructure
- Transportation of cotton from the fields to the gin plants for processing
- Delivery of cotton fibre to the railway to transport it to the spinning facility in Kokand

- Residential complexes in the cities of Karshi (Kashkadarya region) and Gulistan (Syrdarya region) to accommodate staff and their families

The farming model proposed by the Project is based on scientific studies and modern international knowledge of farming in Australia, US and Brazil (where cotton farming is well developed). The Company hired experienced farm managers, agronomists, seed breeders, technical experts, redevelopment specialists for soil and irrigation improvements and other related specialisation required for the Project from Australia and India, to be on the ground implementing, supervising and monitoring the Project progress and implementation of best practices. It also includes rotation crops, mungbeans and wheat, to increase the organic content of soil and to better manage pest and weed conditions.

The Project involves two cotton farming schemes: direct farming by FE “Indorama Agro” LLC and contract farming that engages local farmers to grow and deliver cotton to FE “Indorama Agro” LLC. The direct farming footprint extends to four administrative districts in Kashkadarya region (Nishon and Kasbi) and Syrdarya region (Oqoltyn and Sardoba) to a total area of 27,638 ha in Kasbi and Nishon and 26,559 ha in Oqoltyn and Sardoba.

Contract farming initiated by FE “Indorama Agro” LLC in 2019 to support local farmers has been launched in Kasbi District and will be later extended to a further farming district (Nishon) reaching approximately 900 farms and covering a total land area of 23,000 ha by 2021. Indorama-contracted farms are receiving financial assistance (pre-financing, seeds, fertilizers, defoliant and chemicals), continuous agronomic support and training, and in return will deliver cotton to Indorama at a price no less than the price set by governmental gins and/or based on market mechanism established from time to time. The contract farming in Kasbi covers now a total area of 12,536 ha. Actual area under contract farming may vary from year to year depending upon voluntary participation by the independent farmers.

The Project investments will involve the following key components:

- Cultivation of the leased land, involving land redevelopment, planting, cultivating, harvesting
- Procurement of machinery and equipment for field works
- Procurement of equipment for gin plants, farm depots and warehouses
- Construction of two gin plants, seeds delinting, cotton seed chemical treatment facilities, seven farm depots, two residential complexes and other related infrastructure required from time to time for operations of the Project
- Rehabilitation and construction of cotton and grain storages, storage for crop inputs, mechanical workshop, equipment parking yards
- Restructuring and laser levelling of land plots
- Rehabilitation of irrigation and drainage systems including construction of drainage water collection and recycling facilities, pumps etc.
- Reclamation of abandoned fields, including desalinization
- Direct contracting of farmers to supply cotton to the gin plants
- Transportation of cotton from cotton fields to the gin plants
- Operation of gin plants and other facilities.

The Project facilities will be connected to electricity, water, sewerage and other utilities as required from main supply lines to the battery limit of all the facilities of the Project. Summary of resources used by the Project is presented below:

Source	Consumption	
Maximum Irrigation Water Supply		
Kashkadarya region	HMZ requirements, m^3/ha	Possible Reduction by Project Options, m^3/ha
	6600 (March)	1980 (30%)

Source	Consumption	
Syrdarya region	HMZ requirements, m^3/ha	Possible Reduction by Project Options, m^3/ha
	4300 (April)	1290 (30%)
Pesticides		
Glyphosate	2 – 4 l/ha (at least 3 times per year)	
Propaquizafop	1 - 6 l/ha (1-2 times per year)	
Imidacloprid	80 g/ha (twice per year)	
Cypermethrin + Chlorpyrifos	2 l/ha (once per year)	
Propargite	2 l/ha (twice per year)	
Emamectin benzoat	350 g/ha (once per year)	
Chlorantraniliprole	250 ml/ha (once per year)	
Mepiquat chloride	2 l/ha (as required)	
Fertilizers		
Ammonium nitrate 34%	600 kg/ha (twice a year)	
Ammonium-phosphate 11% / 46%	300 kg/ha (once a year)	
Zinc 9%	2 (ones a year)	
Fuel		
Diesel (machinery)	200 ha per year (21471 t/year)	
Diesel (pumps)	1 l/h (90.24 t/year)	
Gasoline (cars)	7.6 l/100 km (200 t/year)	
Natural gas	• Mistral humidification – 50 m^3/h; • Seed cotton dryer – 235 m^3/h; • Space heating (boiler) – 100 m^3/h.	
Electricity		
Grid electricity	1k kWh/year	

Source: FE “Indorama Agro” LLC

As part of the Project, the Company will construct two residential complexes in Karshi and Gulistan to accommodate staff and families working in Kashkadarya and Syrdarya branches respectively and recruited from other regions of Uzbekistan or abroad. Each residential complex will be designed to accommodate 80 residents in total.

Connection of the new ginning facility in Sardoba district to the power grid will require construction of a 5 km transmission line and this facility is categorised as an associated project. The 35 KV, 5,000 KVA transmission line will be constructed by Uzbeknergo. The construction period is estimated to take three months.

Project Parties

The key Project parties involved in the Project development include organisations and entities who sponsor, finance, operate and support the proposed cotton farming scheme and these are described in the table below.

Project Party	Role
Indorama Corporation Pte. Ltd.	Project Sponsor – Singapore headquartered, leading global manufacturer that owns direct stakes in nine companies across the globe that produce synthetic and cotton yarn, rubber gloves, plastic polymers, fertilizers, and petrochemicals.
FE “Indorama Kokand Textile” JSC	Indirect subsidiary of the Project Sponsor who operates a new spinning facility in Kokand, Uzbekistan
FE “Indorama Agro” LLC	Project Company set up by the Project Sponsor and its indirect subsidiary to establish modern production of cotton and rotation crops (wheat and mungbean) in Kashkadarya and Syrdarya regions of Uzbekistan. The Company will be responsible for the cotton farming scheme and will borrow money from international financial organisations (**IFIs**) to finance the Project.

Project Party	Role
European Bank for Reconstruction and Development (**EBRD)**	The EBRD is an international financial organisation who intends to provide co-financing of the cotton farming project and the portion of the working capital of FE “Indorama Agro” LLC
International Financial Corporation (**IFC**)	IFC is an international financial organisation who intends to co-finance the cotton farming project investment.
Mott MacDonald Limited (**MML**)	MML is acting as the Independent Consultant and is undertaking an Environmental and Social Impact Assessment for the Project with support provided by the local environmental consultancy, Ecostandart Expert (jointly referred to as the **Consultant**).
Ecostandart Expert	Ecostandart Expert is local consultancy commissioned by MML to support collection of the E&S baseline, including water and soil sampling and testing, complete necessary environmental surveys, advise on national compliance and facilitate stakeholder consultation and information disclosure as part of the ESIA process.

Source: Mott MacDonald

Other parties will be selected and involved in the Project preparation during the design and land development/construction phases of the Project.

Project Financing

The European Bank for Reconstruction and Development and International Financial Corporation (jointly referred to as **International Lenders**), are considering providing long-term financing to help the Company in establishing modern cotton production to supply non-contaminated raw materials to the Sponsor’s existing spinning facility in Kokand operated by FE “Indorama Kokand Textile” JSC The financing is expected to cover the Projects’ investment in agricultural machinery, buildings, ginning facilities, land redevelopment and irrigation. The EBRD also considers financing a portion of the working capital requirements of the Company.

Need for the Project

Cotton farming plays a crucial role in the economy of Uzbekistan. Currently the Government of Uzbekistan (**GoU**) is putting efforts in restructuring the cotton sector and improving cotton fibre production and processing with the target to abandon the export of cotton fibre that will eventually be replaced with finished products. Cotton farming clusters are being established across the country to enable the cotton sector investors and manufacturers to get access to high-quality cotton raw materials.

One of the governmental priorities is to extensively involve the private sector in cotton farming to reduce the role of the State in the agricultural production, stimulate direct investment, introduce effective methods of cotton farming, promote deep processing technologies and increase productivity and wages in the agricultural sector. The key driver for making this happens is privatisation of the cotton sector of Uzbekistan by allowing international business to become a key player in the cotton market. The Project forms a significant component of this country-wide privatization process and is designed in part to support the GoU in undressing issues of child and forced labour in the cotton supply chain specifically during harvesting in labour-scarce regions like Syrdarya with high risk of forced labour.

The International Labour Organisation (**ILO**) has been implementing a comprehensive Decent Work Country Programme with Uzbekistan since 2014 that deals with employment and recruitment policies, labour inspection and administration, labour law, occupational safety and health, social dialogue and strengthening trade unions and employers’ organizations. The Project will be able to add value in positive developments of this reforming agenda establishing full-time, decent jobs in the international company, promoting good labour standards and implementing international best practices by insisting on decent work principles in the entire cotton supply chain.

The Project will be able to respond to the governmental initiative and contribute to implementation of the 2020-2024 National Strategy for Developing Textile, Garment and Knitwear Goods Industry in Uzbekistan. The Project will grow and supply cotton for processing at the spinning facility in Kokand which produces compact

combed cotton compact yarn and open end cotton yarn with more than 90% to be exported to Latin America, Europe, Bangladesh, Commonwealth of Independent States (CIS) and Turkey.

The Project will also bring strong added value and know-how to the country in terms of transforming the current farming practices, establishing good industry practice and enabling the country to reach world markets, which have not been accessible until now.

Alternatives Considered

Kashkadarya and Syrdarya regions of Uzbekistan have been selected by the GoU for the Project as traditionally specializing in the cotton sector. Indorama with the support from IFC, completed a Feasibility Study in 2018 to confirm that the proposed regions are optimal for cotton farming, understand local advantages and disadvantages and select districts for cotton farming.

The Feasibility Study considered and assessed the climate and soil conditions, rotation crops farmed, cotton varieties, vegetation periods, soil salinity issues, access of water resources and availability of local workforce.

Based on recommendations of the Feasibility Study four districts have been selected for cotton farming: Kasbi and Nishon both located in the southern part of Kashkadarya region and Oqoltyn with adjacent Sardoba district in the old irrigated zone of Syrdarya region.

“No Project” alternative has also been considered in two main scenarios. The first option includes continuation of the status quo when private farms will continue operation on leased land although this scenario appears to be unlikely due to the widespread reform of the cotton sector in Uzbekistan. The second option suggests that an alternative organisation would take the opportunity to develop the cotton clusters in line with GoU policy. In this scenario, the alternative organisation could potentially proceed with funding from sources other than International Finance Institutions, possibly from a bi-lateral source. Both alternatives would not satisfy the wider objectives aimed at the sustainable development, benefit sharing and reforming the cotton sector of the country. Not developing the Project would result in the benefits noted above not being realised. Furthermore, lack of capacity (that the Project intends to build up) to control the entire cotton supply chain will not enable Uzbek cotton reach world markets, which have not been accessible until now.

Project Land Acquisition and Displacement Compensation

In August 2018 the GoU has made a decision[1] to allocate land to the Project in two phases:

- Phase I (completed) – Land in Syrdarya and Kashkadarya regions
- Phase II (to be completed before 2023) – Land in Fergana and Jizzakh regions.

The Phase I land re-allocation process was completed in December 2018. During Phase 1, the Project leased 54,196 ha of cotton land in Kashkadarya and Syrdarya regions using land lease agreements (LLA) between the Company and respective districts hokimiyats for 49 years. All land parcels allocated for the Project in Phase I were brownfield sites with a long track record of cotton and wheat cropping, though a number of parcels were not farmed in recent past due to degradation of various farming infrastructure and soil due to neglect and poor repair and maintenance. They were previously leased as individual cotton farms and as such treated as legal entities in Uzbekistan. Before the Project 2,897 cotton farms operated in the Project footprint. In total 1,155 cotton farms were approached by the Government in the land acquisition process and 1,068 farms agreed to terminate their LLAs while 87 farms decided to continue their own operation. The lands acquired via LLAs were consolidated in 22 cotton farming sub-districts in Nishon, Kasbi, Oqoltyn and Sardoba districts based on the existing farming sub-district arrangements. The Project does not involve any physical

[1] Decree of the Cabinet of Ministers of Uzbekistan No.632 of 08.08.2018 “On Measures to Establish a Modern Cotton and Textile Production by Indorama (Singapore) in the Republic of Uzbekistan”.

displacement as the land allocated to the Project has always been used for farming operations and does not accommodate any houses.

In Phase II, the Project will acquire more land in two other regions of Uzbekistan: neighbouring Jizzakh region and Fergana region. This land acquisition is likely to be completed before the end of 2023. No details of the Phase II land acquisition were available at the time of writing the ESIA Report. Phase II land acquisition for the Project will be undertaken after consultation and discussions of the Company's proposal with the regional and district hokimiyats. Due to high level of uncertainties with the land acquisition process at Phase II, Fergana and Jizzakh regions were scoped out of this assessment meaning that this ESIA Report will need to be updated during Phase II land acquisition.

Phase I farmers who agreed to terminate their respective LLAs (1,068 farmers in total) were offered to join FE "Indorama Agro" LLC and work full time based on long-term labour contracts. Approximately 45% of the farmers (or 481 people) who terminated their LLAs agreed to join FE "Indorama Agro" LLC and are now working in the Company.

The Government representatives (namely the Hokimiyat) provided no cash compensation for the transfer of land of the farms from LLAs to the Company, because they considered that provision of land was willingly done (namely that it is considered 'voluntary' via the legal framework). In addition to offering permanent jobs, the Company provided cash compensations to 82 farms in Syrdarya region for land cultivation works (for instance, excavations and drainage works) completed on land parcels that were reallocated by the Government to the Project. Compensation was estimated based on the market price of cultivating 1 ha of land and market price of diesel fuel and paid in cash to 35 farmers in Sardoba district and 47 farmers in Oqoltyn district.

While there were efforts to avoid structures by keeping the footprint with the farmer it was realised that they were not of use being surrounded by or in the immediate vicinity of the Project making the structure not useful, the Company informed in December 2019 that they will now enter into negotiations to compensate for the purchase of these buildings. There are about 50 maintenance buildings, structures and sheds in Syrdarya region that are in the inventory. The Company is committed to compensate farmers at replacement cost in cash for the loss of these assets, provided these structures have been legally construction as per the provisions of the local legislation.

Affected farms were allowed to harvest their crops to prevent any loss of crops as a result of the land reallocation process.

Social Impacts

A major adverse impact is associated with land use changes and economic displacement of local farmers engaged in the cotton farming business with limited skills and resources for coping. Moreover, there are limited alternative employment or business opportunities for cotton farmers in their local area and people seeking for jobs have to migrate to other regions or countries. A Livelihood Restoration Plan is being developed in line with the applicable international requirements to identify and implement livelihood restoration strategies and avoid impoverishment of affected farmers. This will reduce the major adverse impact of land use changes and economic displacement to moderate or minor adverse and will propose a monitoring mechanism to measure improvements.

The Project has offered temporary employment opportunities for the directly affected communities (**ACs**) during construction. These opportunities are partly realised and assessed to be minor to moderate in significance and is the primary beneficial effect of the Project during the construction phase.

The land development, preparation and construction phase of the Project will be associated with potential risks on construction workers and communities. A moderate unmitigated risk of the Project is associated with the potential impact on workers' health, safety, wellbeing and labour rights during construction that will last

approximately five to seven months. These risks will be mitigated through implementation of the Environmental and Social Management Plan (**ESMP**) and other social management sub-plans, policies and procedures of the Project incorporated in the ESMP including contractor's supervision of the EHS, labour and social practices on Project sites, enforcement measures in the contractor's contracts allocating sufficient EHS, labour and social resources to manage and monitor contractors' performance.

Beneficial impacts predicted for the Project's operation phase will be associated with the recruitment, supply chain management, capacity building, and procurement of goods, works and services for the Project.

Operation employment opportunities are associated with new skilled jobs created by the Project in the agricultural sector in Kasbi, Nishon, Sardoba and Oqoltyn districts as well as administrative jobs in the city of Tashkent. The Project will recruit more staff to manage two gin plants in Kasbi and Sardoba districts, farm depots across the Project area and two residential complexes in the cities of Gulistan and Karshi which are currently under construction. The Project will also retain seasonal jobs for cotton chipping via the Company as well as permanent and seasonal jobs via contracted farms. Although there will be a net loss in the total number of jobs, the lost jobs are seasonal and there will be a net increase in permanent highly skilled opportunities. Therefore overall, the long-term change in employment as a result of the Project has been assessed to be a beneficial impact of minor to moderate significance

A major beneficial impact is predicted in respect of improvements in labour conditions in the Project supply chain through adherence to ILO standards, Better Cotton Initiative (**BCI**) principles of sustainable cotton farming and decent work, introduction of best practices and implementation of Sustainable Cotton Standards System including across the Project primary supply chain (contracted farms).

Beneficial impacts related to training, skills improvement and know-how transfer are predicted to be moderate to major insignificance and will affect employees of the Company, contracted farms and their farm workers and women in the affected communities.

The localised economic development impact is assessed to be of minor to moderate significance for the affected communities and local suppliers/businesses who may potentially benefit from the Project.

The major adverse impact of livelihood changes and loss of income has already started affecting unemployed farmers and farm workers and seasonal workers traditionally specializing in the cotton weeding and picking. The intended mechanisation of the cotton farming operations and new farming techniques will exacerbate this impact which will be mitigated through the livelihood restoration measures the Company is committed to implementing under the Project LRP and stakeholder engagement activities. Given that the Project area is among the region impacted by forced labour due to mobilisation of workers from non-farm sector, the mechanisation brought about by the Project will reduce the pressure on mobilisation of non-farm workers while protecting the voluntary farm workers and the farming activities by independent farmers will continue with traditional farming techniques without the advanced mechanisation footprints of the Project. The balance between relatively smaller area covered by the Project as compared to a larger area being farmed by independent farmers in the Project districts will moderate the impact of job losses due to mechanisation.

The unmitigated risk of child labour and forced labour associated with the cotton supply chain is estimated to be moderate taking into account the historical issues associated with the use of child labour and forced labour in the cotton sector of Uzbekistan and given recent improvements achieved by Uzbekistan in collaboration with the international community. As the Project is engaging local farmers in the Project supply chain, stringent management, monitoring and reporting arrangements have been recommended by the assessment and will also involve Project engagement with key stakeholders, NGOs, the Government and other projects in their joint efforts of establishing sustainable cotton production practices based on the decent work principle and best international practices in the cotton farming sector. Should these measures be implemented the Project will be able to address the issue of forced labour and child labour at least in the Project coverage area in Syrdarya and Kashkadarya regions of Uzbekistan. A cumulative effect is predicted for the Project which is associated with the sector industrialisation resulting from operation of other five clusters in the Project wider

AoI, construction of processing (gins) and manufacturing (weaving, knitting and garmenting) facilities and replacement of low-paid seasonal jobs by skilled full-time jobs in the cotton clusters and new processing and manufacturing facilities.

Unmitigated localised community disturbance impact is predicted to be negligible to minor during operation and will be addressed through preparation of the Traffic Management Plan (**TMP**) to reduced safety of vulnerable road users on the local roads and residents affected by operations.

The occupational health and safety (**OHS**) risks related to the Project will be associated with the operation of the Project key components and unmitigated risks are predicted to be moderate. However, there are well-known measures to mitigate OHS risks. Similarly, the operation phase of the Project may potentially pose a risk to community health, safety, security and wellbeing from the use of machinery and vehicles; and transportation, storage and use of hazardous substances. These risks can be easily mitigated or prevented.

Adverse impacts of the closure and decommissioning phase will be associated with loss of employment opportunities, repurposing residual facilities and remediating land. Taking into account that the Project lifetime is at least 49 years, such a future scenario makes it difficult to produce an accurate and meaningful prediction of impacts significance and their effects.

The SIA concludes that in terms of socio-economic and community impacts and effects, the Project has the potential to be of moderate to major beneficial significance to the local communities and the regions. The negative social impacts are identifiable and have mitigation measures that are recognised and effective.

Environmental Impacts

No significant adverse impacts on the air quality have been identified during the ESIA study. Only works associated with spraying of fertilizers and pesticides with a risk of inhalation of aerosols are considered to be a significant risk for the workers' health. These works will require implementation of special management and control measures. These have been identified and included within the Project's ESMP.

The potential impact of historical pollution of soil with fertilizers and petroleum products and high mineral salt content is expected to be moderate beneficial as ploughing and leaching of soil of medium sensitivity will improve the soil structure and permeability and will support washing-out of the accumulated pollutants by drainage water.

The main potential contamination impacts for the Project are associated with the use, transport and storage of hazardous materials, and disposal of pesticides and fertilizers remains. Pollutants associated with the Project activities include oil, fuels, pesticides, fertilizers, and other chemicals related to the plants care, such as those for cotton defoliation. Impacts may be a result of leaks and spills from the storage tanks, losses during transportation, usage of excessive volumes of chemicals during plant care activities and inappropriate way of remains disposal.

The current irrigation water consumption in the Project areas is about 3,000 m^3 per 1 ton of raw cotton. It is expected that improvements brought about by the Project will help to reduce water demand for cotton production by 30%, and further reduction of 20% will be achieved through cutting down water losses caused by poor state of the irrigation systems.

The Project provides for the following improvements that will result in overall reduction of water consumption from 3,000 m^3 to 2,000 m^3:

- Laser levelling of fields (expected reduction of water consumption by 20%)
- Improved irrigation and water delivery infrastructure will decrease water transmission losses
- Improvement of drainage systems will decrease soil salinity thus reducing the water use for soil leaching
- Pivots and laterals with targeted water applications will reduce water usage

- Improved irrigation scheduling will help to avoid excessive and deficient irrigation of crops
- Improved soil organic matter will increase soil water holding capacity
- Reduced salinity of soil will result in lower / eliminated water applications for leaching.

In addition, drainage water reuse for irrigation is being considered as in due course it is expected that with improved melioration management the soil salinity will reduce allowing irrigation tail water to be recycled thus further optimising water use. Drainage water is monitored for quality (mineral content) and availability. The Company will use the monitoring data and assessment of drainage water reuse efficiency to make a decision about potential recycling schemes. Therefore, considering that irrigation water is supplied to the Project area from reservoirs rather than straight from the rivers, and that the Project cropland makes up about 5% of irrigated land in Kashkadarya Region and 28% of irrigated land in Syrdarya Region, the Project impact on the Amu Darya River due to reduction of water abstraction for irrigation can be assessed as negligible beneficial and as minor beneficial for the Syr Darya River.

It is important to highlight the risks of uncontrolled application of pesticides and fertilizers in the fields, and the risks of excessive soil leaching which may result in pollution of drainage water and recipient water bodies. Increased levels of salts and pesticides will affect biocoenoses in the drainage canals which provide habitat for multiple plant and animal species and serve as forage areas for birds of prey. Given the poor initial quality of water in the Kashka Darya River and Deuhana Lake, sensitivity of these receptors to the pollution impact is assessed as medium. The impact on receptors caused by potential increase of salt and agrochemicals levels in drainage water due to reclamation and leaching of abandoned and salinised fields at the initial stage of the Project operation is assessed as significant adverse, with a trend toward reduction to minor, provided that a reasonable approach is adopted for application of fertilizers and pesticides.

Throughout the Project operation, workers will contact irrigation water and drainage water that may carry biological hazards such as helminthic and acute intestinal infections. This is due to the fact that local communities use water distribution and drainage canals for livestock watering and dipping. The magnitude of occupational health impact is assessed as major and the significance of the impact is assessed to be major.

The Aidar-Arnasay lake system being a key ornithological area features a high sensitivity, therefore, impact on this receptor is assessed as major adverse at the initial stages, with a trend toward reduction to moderate or minor, provided that a reasonable approach is adopted for application of fertilizers and pesticides.

Two Uzbekistan Red Data Book species were recorded within the Project zone of influence (**ZoI**): Ficus carica and Platanus acerifolia. Their presence was recorded in the Project area. The direct impact will consist in removal of these trees during the upgrading of existing irrigation and drainage system and change of fields configuration. These species are considered to be of medium conservation value. Impacts of the works are considered to be minor adverse in magnitude; therefore, if all trees across the Project territory are to be saved, the effect is minor adverse and negligible.

Potential hazardous materials and wastes may include: pesticides, fertilizers, oils and solvents waste, contaminated packaging, cleaning materials, contaminated soils (potentially from leakage and spillage), used batteries, mercury lamps. Management of these hazardous substances, particularly handling and final treatment or disposal options will require close consideration. Specific details of such waste management plans will be prepared as part of design and construction documentation.

Mitigation and Enhancement Measures

A comprehensive Environmental and Social Management Plan has been developed as an integral part of the ESIA Report to guide mitigation of all potential significant and insignificant impacts and risks identified for the Project. The ESMP covers all phases of the Project lifecycle and considers opportunities for enhancement of the Project benefits. Summary of social mitigation and enhancement measures is provided in the table below:

Type of mitigation / Enhancement	Provisions to Address Socio-Economic Impacts
Embedded mitigations	• Project commitments to workers' rights established within the Project documentation, including contracts with all contractors and their sub-contractors • Modifying procurement practices to support local suppliers and services providers • Assigning community liaison officer responsibilities • Building accommodation and staff facilities to international standards • Training sessions, knowledge sharing and improvement of skills • Optimising housing accommodation design and management
Mitigation of significant effects	• Introduction of management systems in the Company (occupational health and safety, environment and quality management) to international standards • Monitoring of implementation of Project commitments to workers' rights • Workers' Code of Conduct established by the contractors at the Project construction phase and in the Company for the staff and contracted farmers • Regular toolbox talks by all contractors and sub-contractors regarding Project commitments to worker's rights, the Workers' Code of Conduct and occupational health and safety plans and procedures • Assigning Project EHS Officers • Assigning Labour and Social Officers • Better Cotton Initiative certification • Project focus on OHS with appropriate planning, procedures and training • Drills on emergency preparedness and response plans at the gin plants • Staff grievance mechanism • Training of all international workers in cultural sensitivities of Uzbek communities (via brochures) • Developing Project monitoring programme for the cotton harvesting season • Collaboration with the third-party monitoring missions • Training and capacity building of farmers and suppliers in eliminating child and forced labour • Establishing a public grievance mechanism • Engagement with key Project stakeholders • Keeping records and reporting on mitigation measures for significant adverse effects
Mitigation of insignificant effects	• Toolbox talks for safeguarding personnel and property • Training of security staff in human rights, use of forces, security plan, emergency preparedness and incident reporting • Community health, safety and security awareness leaflets • HIV/AIDS awareness raising sessions • Ongoing consultation and information disclosure • Fencing and signage around site perimeter • Annual reporting • Retrenchment planning in decommissioning
Enhancement	• Project Recruitment Policy stating a requirement to prioritise local employment (this will also be reflected in contractor's employment policy) especially for women • Human Rights Policy that prohibit discrimination of any kind, child and forced labour and promote equal opportunities for the workers • Training and Mentoring Policy • Personal development reviews to assess staff achievements and allow carrier goals to be planned and supported by the management • Training centre for operators to secure a pool of skilled workers to operate Project facilities for the lifetime of the Project

Type of mitigation / Enhancement	Provisions to Address Socio-Economic Impacts
	• Project Procurement Policy to promote procurement of local services, goods and works • Establishing targets for engaging local female-headed businesses and female farmers • Community Development Programme • Advertising opportunities and describing recruitment process to the ACs • Special measures to promote employment and other benefits to women

For the full detail of mitigation and enhancement measures refer to Volume IV of the ESIA Report.

Monitoring and Reporting

EBRD and IFC require internal monitoring and external or independent monitoring of all Category A projects or projects with significant impacts.

FE “Indorama Agro” LLC will monitor implementation of the mitigation measures provided in the ESMP and compliance with the national requirements at all levels of corporate responsibility. The Company will report on environmental and social performance of the Project to the International Lenders and key Project stakeholders twice per year during the development/construction phase and annually during the operation phase.

Project Commitments

The Project will deal with any land acquisition and associated displacement issues in compliance with the applicable international standards and best international practices.

The Project has strong commitments to safeguarding workers’ rights and achieving compliance with the applicable national and international requirements and International Labour Organization fundamental conventions through all phases of the Project lifecycle.

The Project will base employment decisions on principles of non-discrimination and equal opportunity, in particular fair and equal pay, especially for women carrying out the same work as men.

The Project will ensure that workers are not charged fees to gain employment on the Project.

The Project will observe statutory labour requirements of Uzbekistan including establishment of a labour grievance mechanism and the minimum age for employment

The Project commits to meet international standards related to paying all wages, including bonuses and premium pay for overtime work, to all employees in a timely fashion and in a manner consistent with ILO Convention 95.

The Project will ensure that all workers continue to be paid during any periodic maintenance outage periods.

The Project will ensure acceptable conditions of work including by observing national statutory requirements related to minimum wages and hours of work.

The Project commits to ensure rigorous standards for occupational health and safety are in place.

The Project commits to monitor the contractors in safeguarding their workers’ rights and providing safe conditions for work and accommodation.

The Project is committed to prevent any forms of child labour and forced labour in the Project supply chain or any other operations it will be dealing with.

The Project will promote and support the right of workers for association ad collective bargaining.

The Project will collaborate with the GoU, international organisations, NGOs and local activists in building up a sustainable cotton standard system based on key BCI principles across the Project direct and indirect farming operations.

The Project is committed to share benefits through provision of support, training and jobs to farmers and local communities and promoting participation of women in the cotton farming business and their promotion to management roles within the Company.

Project Contact Details

Contact details for enquires on this ESIA are given below:

Project Proponent	Information
Name of Company:	FE “Indorama Agro” LLC
Address:	No.11/1, Amir Temur Ave., Mirobod District, Tashkent
Name of the Contact Person:	Mr. Amit Jain – CEO, FE “Indorama Agro” LLC
Telephone:	
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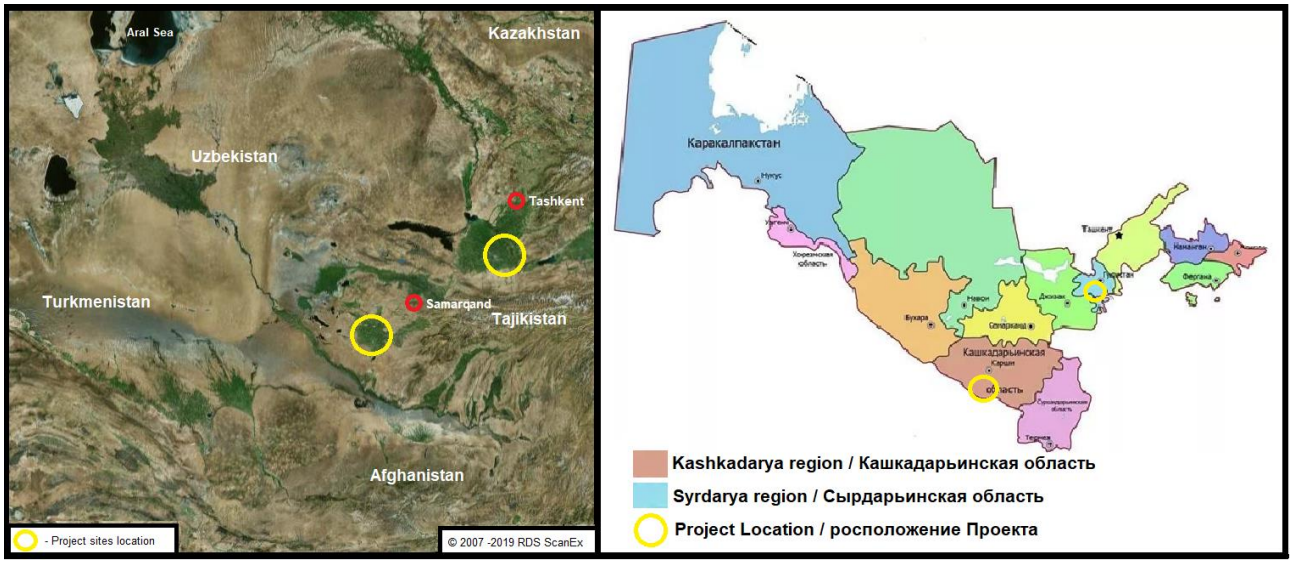
Website:	http://www.indorama.com/

1 Project Description

1.1 Project Location and Footprint

The Project is located in Kashkadarya and Syrdarya regions of Uzbekistan in the basins of Kashkadarya and Syr Darya Rivers respectively which are fed by fresh water from Pamir Mountains glaciers. These two regions are characterised by a developed agricultural sector and extensive irrigation systems for the cropping areas. Map 1.1 below demonstrates the location of the Project areas.

Map 1.1: Project location



Source: http://kosmosnimki.ru/?permalink=4ZIRD

The Project involves two cotton farming schemes: direct farming and contract farming. Direct farming is a scheme of farming cotton which is directly managed by FE “Indorama Agro” LLC. This document refers to land acquisition for direct farming. Contract farming is a scheme whereby the Company engages local cotton farms to grow and deliver harvested cotton to the Company via supply contracts for processing. This document refers to supply chain land for contract farming.

In Uzbekistan, a farm is a legal entity for the production of agricultural products and other agricultural activities and operating leased land[2]. In August 2018 the GoU made a decision to provide land and farms to the Project through the signing of Decree of the Cabinet of Ministers of Uzbekistan No.632 of 08.08.2018 “On Measures to Establish a Modern Cotton and Textile Production by Indorama (Singapore) in the Republic of Uzbekistan”. This Decree states that the land will be transferred to Indorama, a private company, for the purpose of socio-economic development, land acquisition. Hence, the land acquisition is a form of land expropriation for the state and public needs, organised by the Government via the regional and district hokimiyats.

The sections below detail land acquisition for direct farming, the use of supply chain land by contract farms, land already acquired by the Company, the approach taken to land acquisition, and a summary of farms affected, compensation provided and assets to be compensated in the future.

[2] RoU Law on Lease No.427-XII of 19.11.1991.

1.1.1 Land Acquisition for Direct Farming

Land acquisition for the Project was planned for two phases:

- Phase I (completed in 2018) – Land in Syrdarya and Kashkadarya regions
- Phase II (to be completed before 2023) – Land in Fergana and Jizzakh regions.

The direct farming footprint extends to four administrative districts in Kashkadarya and Syrdarya regions. The Project established 22 cotton farming sub-districts to facilitate and manage farming operations across a total area of 54,196 ha in Nishon, Kasbi, Oqoltyn and Sardoba as detailed in Table 1.1.

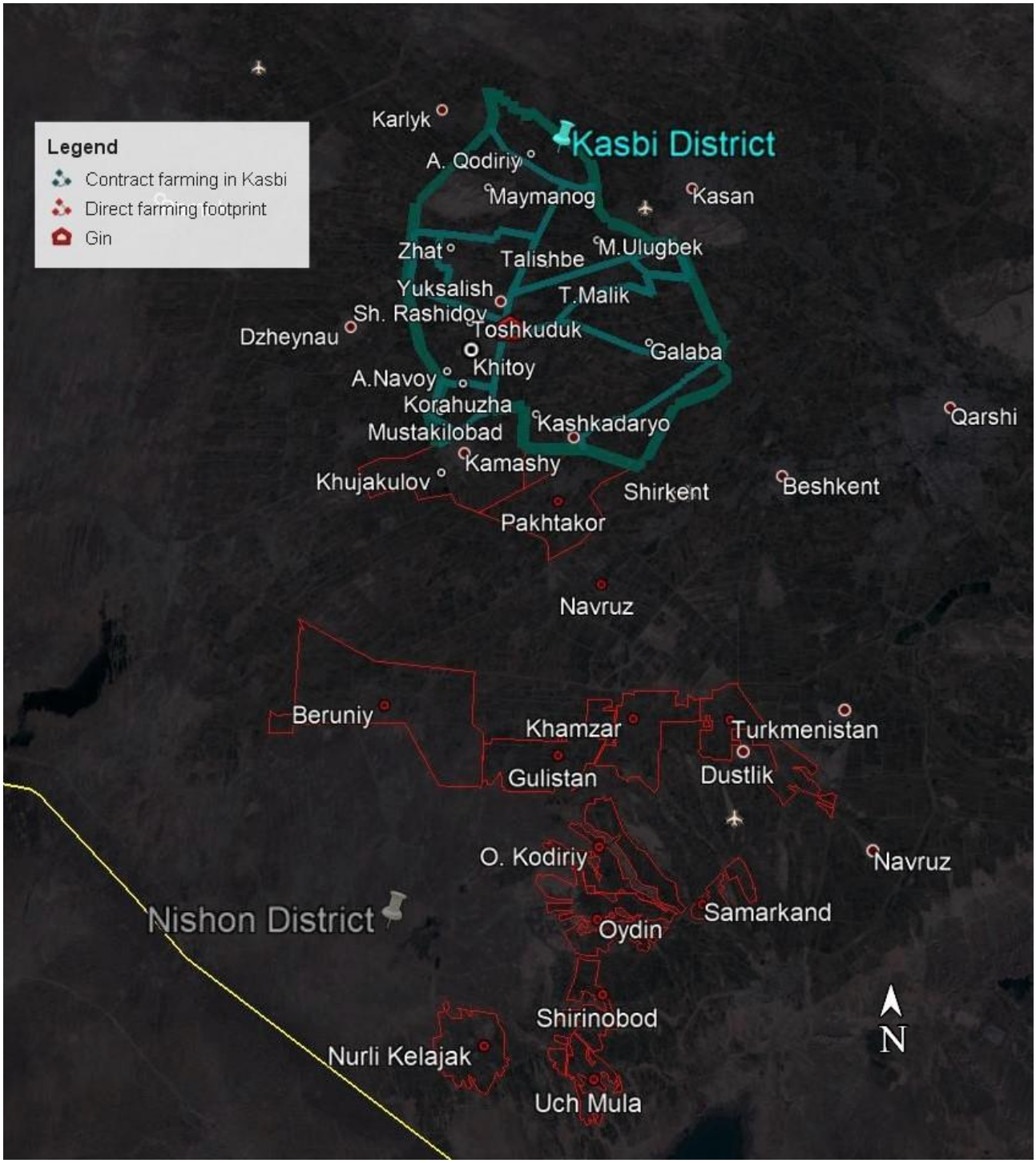
Table 1.1: Summary of Phase 1 direct farming land acquired for the Project in 2018

Region	District	Sub-districts	Allocated land, ha
Kashkadarya	Kasbi	4	13,088
	Nishon	9	14,549
Syrdarya	Oqoltyn	5	12,770
	Sardoba	4	13,789
Total:		**22**	**54,196**

Source: FE “Indorama Agro” LLC

The Project’s direct farming in Kashkadarya region covers a total area of 27,637 ha in Kasbi and Nishon districts (Map 1.2).

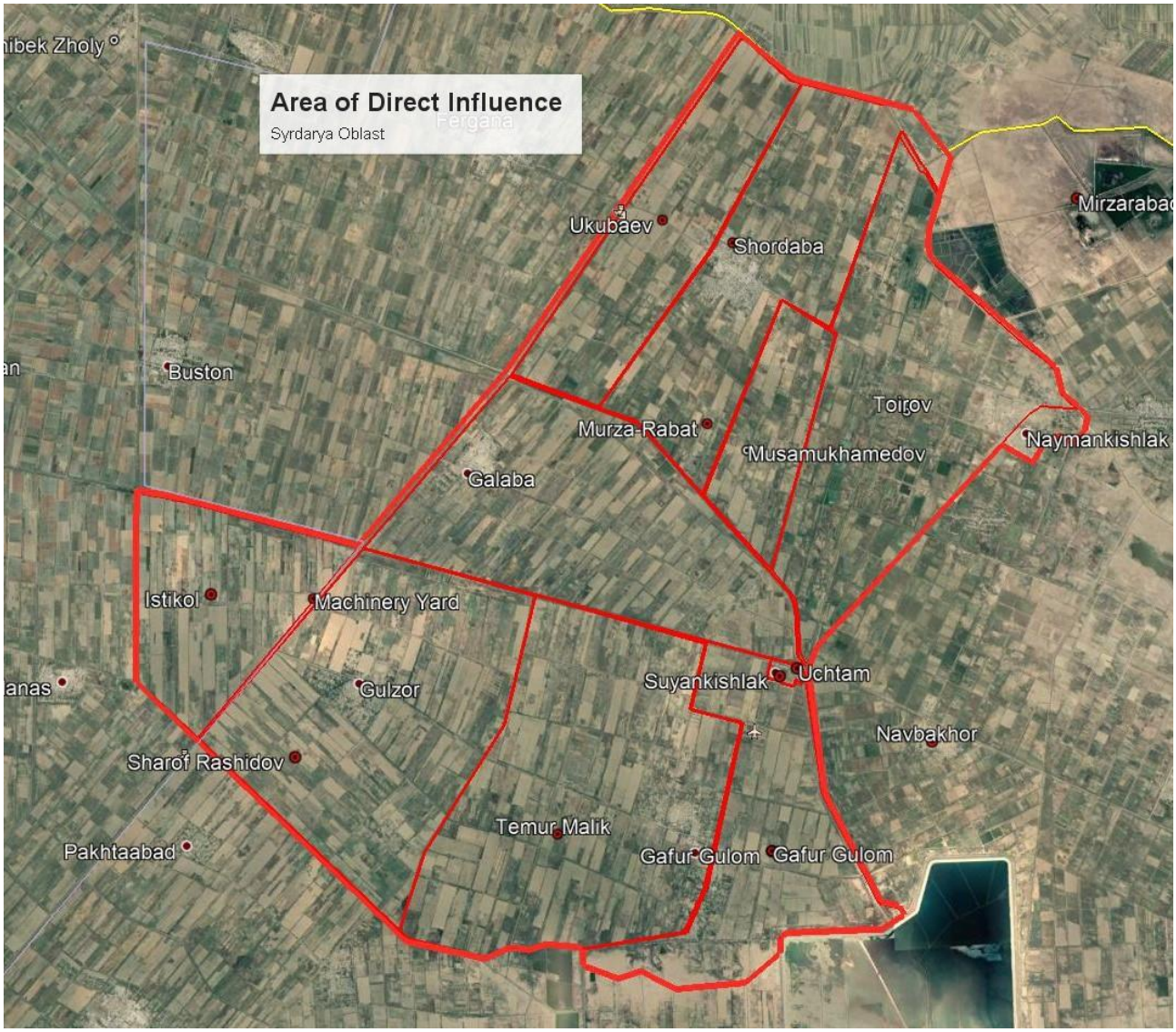
Map 1.2: Project footprint in Kashkadarya region of Uzbekistan



Source: Mott MacDonald based on information provided by FE “Indorama Agro” LLC

The footprint of the direct farming scheme in Syrdarya region extends to a total area of 26,559 ha in Oqoltyn and Sardoba districts (Map 1.3).

Map 1.3: Project footprint in Syrdarya region of Uzbekistan



Source: Mott MacDonald based on information provided by FE “Indorama Agro” LLC

Two gin plants will be constructed by the Project to produce cotton fibre and supply it to the existing spinning facility in Kokand operated by FE “Indorama Kokand Textile” JSC. Indorama purchased this land in addition to the direct farming land. There is also a transmission line which requires land. The old gin and cotton storage area had a substation as does the neighbour community, so no land has to be acquired for the substations.

1.1.2 Supply Chain Land for Contract Farming

In addition to direct farming which uses Company employees and is discussed above, contract farming was initiated by FE “Indorama Agro” LLC in 2019 to support local farmers. This approach was launched in Kasbi district. For supply chain land, engagement with local farmers resulted in 394 supply contracts signed with existing cotton farms in Kasbi. In 2019, the contract farming in Kasbi covered a total area of 12,536 ha as summarised in Table 1.2 below. In 2020, contract farming will be extended to Nishon district.

Table 1.2: Contract farming in Kasbi district

No.	Sub-districts	Contracted Farms	Producer Units (PUs)	Cotton Area, ha
1.	Kashkadaryo	58	PU-1 (82 farmers / 2,662 ha)	2,053
2.	Pakhtakor	24		609
3.	Galaba	52	PU-2 (118 farmers / 3,893 ha)	1,829
4.	T. Malik	35		1,004
5.	M. Ulugbek	18		672
6.	Talishbe	13		388
7.	Maymanoq	40	PU-3 (84 farmers / 2,574 ha)	1,373
8.	Komilon	44		1,201
9.	A Navoi	58	PU-4 (110 farmers / 3,408 ha)	1,435
10.	Sh. Rashidov	44		1,973
	TOTAL	**394**	**4 Producer Units**	**12,536**

Source: FE “Indorama Agro” LLC

Indorama-contracted farms are receiving financial support (pre-financing, seeds, fertilizers, defoliant and chemicals) that covers 60% of a contracted farm costs, continuous agronomic support and training, and in return will deliver cotton to Indorama at a price no less than the price set by governmental gins. Each contracted farm is owned and managed by the head of the farm (hereinafter jointly referred to as the contract farmers).

The contract farming area is divided into producer units (**PU**), each responsible for two to four cotton farming sub-districts managed by one PU Manager who reports directly to the Sub-district Manager. PU Managers are supported by local agronomist to collaborate and assist local farmers on a day-to-day basis.

While contract farming currently engages 394 farms in Kasbi, in the future expansion of supply chain land may reach approximately 900 farms covering a total land area of 23,000 ha in 2020 (refer to Table 1.3 for details).

Table 1.3: Expansion of the contract farming footprint, two-year outlook

Period	Contracted Farms	Cotton Area, ha	Engaged Farm Workers
2019	394	12,536	1,299
2020	900	23,000	2,500*

Source: FE “Indorama Agro” LLC *Estimated

1.1.3 Land Already Acquired for the Project (Phase I)

The Phase I land re-allocation process was started in August 2018 after a decision to allocate the land to the Company was taken by the Cabinet of Ministers of Uzbekistan through a decree[3]. By December 2018, the Project had acquired 54,196 ha of cotton land in Kashkadarya and Syrdarya regions (27,637 ha and 26,559 ha respectively) using land lease agreements (LLA) between the Company and respective districts hokimiyats for 49 years.

All land allocated for the Project are brownfield sites having a long track record of cotton and wheat cropping. The land was never used for horticulture or livestock farming and therefore the Project will not disturb the existing grazing or fodder lands used by neighbouring households or communities for livestock farming. The overview of land (including irrigated land) acquired by the Project in each district is provided in the table below.

[3] Decree of the Cabinet of Ministers of Uzbekistan No.632 of 08.08.2018 “On Measures to Establish a Modern Cotton and Textile Production by Indorama (Singapore) in the Republic of Uzbekistan”.

Table 1.4: Phase 1 land acquisition by region, district and sub-district

Region	District	Sub-districts	Total Parcels	Allocated Land, ha	Irrigated land, ha	Poor Condition Land, ha
Kashkadarya	Kasbi	Beruniy	191	4,267	4,089	191
		Navrus	186	3,846	3,711	-
		Pakhtakor	56	1,054	1,027	-
		Khujakulov	195	3,921	3,783	-
		Sub-total	*628*	*13,088*	*12,610*	*191*
	Nishon	Nurli Kelajak	145	1,748	1,467	75
		Uch Mula	80	871	871	93
		Shirinobod	75	471	431	41
		Oydin	190	1,878	1,623	647
		A. Qodiriy	205	2,122	1,919	314
		Hamza	145	1,983	1,864	593
		Gulistan	290	2,373	2,085	281
		Turkmenistan	228	2,421	2,166	228
		Samarqand	57	683	608	74
		Sub-total	*1,415*	*14,549*	*13,001*	*2,347*
Total in Kashkadarya region:			**2,043**	**27,637**	**25,611**	**2,538**
Syrdarya	Oqoltyn	Sardoba	207	2,805	2,329	273
		Musamukhammedov	125	1,005	810	55
		Q. Ukuboev	123	2,592	2,476	51
		A. Toirov	201	2,978	2,841	289
		Z.M. Bobur	173	3,390	3,144	279
		Sub-total	*829*	*12,770*	*11,601*	*947*
	Sardoba	Istiqlol	112	2,147	2,060	99
		Sh. Rashidov	301	4,440	4,206	-
		T. Malik	301	5,439	4,910	527
		G. Gulom	123	1,762	1,650	82
		Sub-total	*837*	*13,789*	*12,825*	*709*
Total in Syrdarya region:			**1,666**	**26,559**	**24,426**	**1,656**
Grand Total		**Project**	**3,709**	**54,196**	**50,037**	**4,194**

Source: FE “Indorama Agro” LLC

Land plots received by the Project were consolidated into 22 cotton farming sub-districts (as detailed in Table 1.4) based on the existing administrative arrangements in each district.

1.1.4 Land to be Acquired for the Project (Phase II)

The Project will acquire more land to expand the footprint in two regions: neighbouring Jizzakh region and Fergana. No details of the Phase II land acquisition and regions were available at the time of writing this ESIA Report. After consultation with regional and district hokimiyats, it is planned for Phase II land acquisition to be completed before the end of 2023. Mitigation through the existing resettlement management instruments will align the Project with the applicable international requirements.

1.1.5 Description of the Approach for the Completed Land Acquisition Process (Phase I)

The land acquisition processes to date have been managed by the district hokimiyats in compliance with the national land laws and regulations[4] and based on the Decree. Refer to Chapter 2 for details on the national legislative framework.

After the Decree, district hokimiyats made their decisions whether to use legal channels to expropriate or negotiate settlement with farmers willing to terminate their land lease. They selected the latter approach. To date, the court system has not been used to legally acquire any land through expropriation processes, even though this was and is an option. To date, there have been no disputes requiring legal intervention. To date, all land for direct farming has been acquired through negotiations with farms to terminate early their previous LLAs. In all Project districts hokimiyats negotiated with the affected farms with LLAs to terminate their rights to lease land plots so the Project could use the land for direct farming. Farmers willingly agreed to the termination during the negotiations, often ignoring or not requiring the three-month written notice before termination as set out in Clause 20 of the LLAs. The process is legitimate but does create a potential risk for district hokimiyats of a legal argument by former LLA Farm Manager about not the notification procedure. The possibility of this risk is only valid during the three-year period which is allowed by law (period of limitations[5]). However, all of the LLAs were signed in late 2018 so one year has passed, and to date there have no court cases. The risk is to the district hokimiyats, not to the Company.

Willing termination of the LLA (considered 'voluntary' and allowed in Article 32 of the RoU Law on Farms) does not envisage any compensation of losses or damages (including lost profit) to the affected farms. If farms do not willing terminate LLAs and they require court intervention through a land expropriation process, then there is an obligation to pay compensation to tenants for their losses or damages, including lost profit (Articles 41 and 86 of the RoU Land Code). To date, hokimiyats have not paid any cash compensation for land reallocated to the Company.

In the process of land reallocation, the district hokimiyats had to provide a reason for the transfer from farms to the Company. All four districts indicated willingness to terminate LLAs as a reason. Of the four districts, Kasbi was unique in that it put forth an additional argument of optimisation of the of the size of the farm's land[6]. Optimisation generally includes some reduction or expansion to the size of the land plot. There is small possibility that farmers could go to court to regain their land by stating the reason of land optimisation was not correct. As above with the risk related to procedures, the risk is with the district hokimiyats and not the Company, and again since late 2018 not court cases have yet been launched.

1.1.5.1 Guiding Principles and Selection Criteria for Land Acquisition

Preliminary land selection in the Project districts was completed by the Company in close collaboration with the district hokimiyats using the following general principles:

1. Prevent or avoid any displacement
2. Protect farmers' rights
3. Consult and negotiate
4. Compensate
5. Manage grievances

[4] RoU Land Code (Articles 5, 36, 37, 38). RoU Civil Code (Articles 382 and 384), RoU Law "On Farms", RoU Law "On Lease" (Article 13), Regulation on Farms Land Optimisation and Liquidation Procedure (adopted by Decree of the Cabinet of Ministers of the Republic of Uzbekistan No.22 of 31.01.13), Regulation on Land Allocation Procedure for Long-Term Land Lease by Farms (approved by Decree of the Cabinet of Ministers of the Republic of Uzbekistan No.476 of 30.10.2003).

[5] Article 150 of the Civil Code

[6] Clauses 4 and 9 of the Regulation on the Farm and Optimisation and Liquidation Procedure annexed to Decree of the RoU Cabinet of Ministers No.22 of 31.01.2013 "On Approval of the Regulation on the Farm and Optimisation and Liquidation Procedure"

The land acquisition process tried to avoid as much as possible any farm maintenance buildings, structures and facilities. During the land selection process, the Company jointly with IFC Agri Advisory team visited each parcel to make sure that no buildings, structures or facilities are located on land that was to be acquired by the Project. When the presence of structures or facilities was identified, the Company held consultations with the district hokimiyats to replace such land parcels and carve them out of the footprint. Because of the latter activity, some buildings and structures have been left alone with little utility among larger pieces of land used by the Company so there has been a recent decision to look at purchasing them with appropriate compensation (see Sub-section 1.1.8 for further details).

Following the pre-selection of land parcels, the district hokimiyats held general meetings with the farmers followed by individual consultations and negotiations with the affected farmers.

1.1.5.2 Engagement, Consultation and Negotiation

Consultations with the affected farms started after the working Groups were set up and were led by the district hokimiyats. All four districts were informed about the project in October 2018, followed by general meetings with farmers in November 2018 as well as negotiations with individual farmers and advertising of Project work opportunities. Grievance mechanisms with the local government existed that farmers and farm workers could use. In three of the four districts there were no grievances raised during the land reallocation process. In Nishon, issues were raised to the hokimiyat about the possibility to use cotton plant leftovers[7] and the allowance of livestock in the Company's lands. Previously women used the leftovers for cooking but now the Company is using the leftovers for improving soil organic content and thus preventing gradual soil degradation and improve soil humus structure for better water retention and water use efficiency which has a cost implication to the families to buy alternative fuel sources. In Nishon, no records of meetings were maintained, in Kasbi general records were maintained and in Sardoba and Oqoltyn records were maintained. Alternative use of leftovers results in positive GHG impact by the project in addition to the prevention of long-term soil degradation.

1.1.5.3 Compensation and Livelihood Restoration

Farmers who willingly terminated their LLAs were not eligible for any land compensation by the hokimiyats for losses or damages (including loss of profit). Farms did not request compensation, probably because of the ongoing cotton sector restructuring and move to larger farms. Four farmers in total (in Kasbi and Nishon) who asked for land for land replacement were granted it by the district hokimiyats and were given a LLA for the replacement land.

The Company also did not pay any compensation to acquire the land. However, the Company provided details of employment opportunities and contract farming options available in the clusters. In total 481 farm staff affected by Phase 1 land acquisition accepted employment with Indorama. There were no staff selection criteria set up by the Company so anyone who decided to be part of the Company was hired. The Company did pay cash to 82 farmers for the cost of improvement works such as excavations and drainage improvements undertaken by the farmers on parcels reallocated to the Company.

A summary of compensation and livelihood restoration measures is provided in the table below.

Table 1.5: Compensation and livelihood restoration by district (Phase I land acquisition)

Measure	Kashkadarya region		Syrdarya region	
	Kasbi	Nishon	Sardoba	Oqoltyn
District Hokimiyats				
Monetary compensation of losses (by hokimiyats)	No monetary compensation of losses or damages provided (no eligibility due to willing termination)			

[7] Uzbek women like to use parts of the cotton plant for cooking. They use to collect the wooden parts to dry them.

Measure	Kashkadarya region		Syrdarya region	
	Kasbi	Nishon	Sardoba	Oqoltyn
Land replacement (by the hokimiyats)	3 farmers	1 farmer	-	-
Loss of harvest	All farms harvested crops (cotton harvested by November 2018 and winter wheat in spring 2019)			
FE “Indorama Agro” LLC				
Monetary compensation of costs and works (by the Company)	-	-	82 Land rehabilitation works	
New permanent jobs in the Company	117	60	194	110
Cotton Supply Contracts	394	-	-	-

Source: ESIA consultations with district hokimiyats, December 2019

Following the general meeting and few rounds of individual consultations the farmers filed their respective application letters to the hokimiyats for the termination of the LLAs.

According to the district hokimiyats and farmers associations, no grievances have been received from the farmers and no court suits were filed in respect of the Phase 1 land acquisition process. Consultation and engagement were targeted inter alia at addressing any questions and concerns raised by the farmers during the meetings.

1.1.6 Summary of Farms Affected by Project Land Acquisition

According to information provided by the district hokimiyats and the Company, 1,155 cotton farms were approached in the land acquisition process including 65 female-headed farms. All farmers who agreed to terminate their respective LLAs (1,068 farmers in total) were offered to join FE “Indorama Agro” LLC and work full time based on long-term labour contracts. Approximately 45% of all farmers (or 481 people) who terminated their LLAs are now working in the Company as agronomists, field workers on their former land plots, lead brigades, or operate tractors and other machinery. Eighty-seven farmers continued operation on their own farms without terminating their LLAs or were compensated by other more productive land of similar size or more. Refer to Table 1.6 for details.

Table 1.6: Farms affected by the land acquisition process

Location	Farms approached (including female-headed farms)	Farms which agreed to terminate the LLA	Farms which continued operation with pre-existing LLA	Farmers employed by the Company	Total land allocated, ha	Including reserve land[8] area, ha
Kashkadarya region						
Kasbi	353 (13)	340	13	117 (34%)	13,789	-
Nishon	335 (30)	326	9	60 (18%)	12,770	-
Sub-total	*688 (43)*	*666*	*22*	*177 (27%)*	*26,559*	-
Syrdarya region						
Sardoba	243 (11)	207	36	194 (94%)	13,088	-
Oqoltyn	224 (11)	195	29	110 (56%)	14,549	1,380.7
Sub-total	*467 (22)*	*402*	*65*	*304 (76%)*	*27,637*	
Total	**1,155 (65)**	**1,068**	**87**	**481 (45%)**	**54,196**	**1,380.7**

[8] Reserve land is unzoned and undistributed land of the local government in districts that may be allocated for lease to agricultural land users. A respective district government takes a decision regarding distribution of the reserve land.

Source: FE “Indorama Agro” LLC

1.1.7 Summary of Cash Compensation Paid by the Company to Farmers for Improvement Works

The Company provided cash compensation to 82 farms in Syrdarya region for land cultivation works completed on land parcels that were signed over to the Project. Compensation was estimated based on the market price of cultivating 1 ha of land and market price of diesel fuel. There is no information of compensation being paid for similar works being undertaken in Kashkadarya region.

Table 1.7: Summary of cash compensations by the Company in Syrdarya region

No. of Farms	District/ Sub-district	Plowing Area		Fuel				Total Paid
		Ha	UZS/ha	Amount, UZS	Litre	Price	Amount, UZS	UZS
Sardoba district								
8	T. Malik	223.8	250,000	55,950,000	6,714.0	4,800	32,227,200	88,177,200
11	G. Gulom	330.5	250,000	82,625,000	9,915.0	4,800	47,592,000	130,217,000
14	Sh.Rashidov	512.4	250,000	128,105,000	15,372.6	4,800	73,788,480	201,893,480
2	Istiklol	63.4	250,000	15,850,000	1,902.0	4,800	9,129,600	24,979,600
35	*Total Sardoba*	*1,130.1*		*282,530,000*	*33,903.6*		*162,737,280*	*445,267,280*
Oqoltyn district								
12	Sardoba	187.8	250,000	46,950,000	5,634	4,800	27,043,200	73,993,200
7	Musamuhamedov	141.6	250,000	35,400,000	4,248	4,800	20,390,400	55,790,400
8	K. Ukubaev	144.9	250,000	36,225,000	4,347	4,800	20,865,600	57,090,600
3	Z.M. Bobur t	32.0	250,000	8,000,000	960	4,800	4,608,000	12,608,000
17	A. Toirov	289.0	250,000	72,250,000	8,670	4,800	41,616,000	113,866,000
47	*Total Oqoltyn*	*795.3*		*198,825,000*	*23,859*		*114,523,200*	*313,348,200*
82	**Total Syrdarya**	**1,925.4**		**481,355,000**	**57,762.6**		**277,260,480**	**758,615,480**

Source: FE “Indorama Agro” LLC

1.1.8 Summary of Assets Subject to Compensation

A few maintenance structures, sheds and buildings in Syrdarya region may not be used any more by the local farmers being surrounded or immediately adjacent to the Project land. Previously these structures had been carved out of footprints as an effort to minimise impacts. However, Farm Managers are finding little utility from the structures so the Company has agreed to negotiate compensation. Replacement value is the normal method for deciding on compensation. The process of compensating for the structures is under discussion and will soon start.

1.2 Project Components and Technologies

1.2.1 Project Farming Model

The Project will grow cotton, winter wheat and mungbean or any other crops suitable for rotation with cotton. The farming model with crops rotation targets at increasing organic content in the soil and will facilitate efforts in managing pesticides and weed conditions.

The Company targets an average cotton lint production of 51,000 tonnes per year, wheat production of 72,000 tonnes per year, and mung bean production of 7,500 tonnes per year. FE “Indorama Agro” LLC is considering cropping three local cotton seed varieties for planting: Bukhara-6, Bukhara-8 and Sulton. These varieties have a good history of cropping in the proposed Project area, high potential of productivity, quality of cotton and seeds, and high potential for future breeding.

1.2.2 Key Project Components

The Project investments will involve the following key components:

- Cultivation of the leased land, involving land development, planting, cultivating, harvesting
- Procurement of machinery and equipment for field works
- Procurement of equipment for gin plants, depots and warehouses
- Construction of two gin plants, seeds delinting, cotton seed chemical treatment facilities, farm depots, residential complexes and other related infrastructure required from time to time for operations of the Project
- Rehabilitation and construction of cotton and grain storages, storage for crop inputs, mechanical workshop, equipment parking yards
- Restructuring and laser levelling of land plots
- Rehabilitation of irrigation and drainage systems including construction of drainage water collection and recycling facilities, pumps etc.
- Reclamation of abandoned fields, including desalinization
- Contracting of farmers to supply cotton (to reach 900 individual farms in 2020)
- Transportation of cotton from cotton fields to the gin plants
- Operation of gin plants and other facilities.

1.2.2.1 Connection to Utilities

The Project facilities will be connected to electricity, water, sewerage and other utilities as required from main supply lines to the battery limit of all the facilities of the Project.

The depot and gin plant in Kasbi district will be connected to the water supply networks operated by the local water utility “Kasbi Suvokova”. Drinking water for domestic and other needs of the depot and gin plant in Sardoba district will be supplied from artesian wells to be drilled at the gins and depots sites.

The Project will connect depots and gin plants to domestic wastewater collection systems. In absence of central sewerage systems, domestic wastewater will be collected in septic tanks and subsequently removed for treatment by specialized contractor.

The Project will construct storm water collection systems vehicle depots and two gin sites. These facilities should include grit removal and oil trapping to comply with the national requirement. Treated storm water will be discharged to drainage collectors.

Water recycling systems will be installed at vehicles depots for washing agricultural machinery and other vehicles.

1.2.2.2 Gin Plants

The Project will construct two gin plants (each with 2 sets of 2x161 saw gins) in Kasbi and Sardoba districts respectively to process harvested cotton. The capacity of each plant is 30 bales/h. With each bale of 210 kg the plant will produce approximately 150 MT/d of cotton fibre. The gin plant in Kasbi district will be constructed at the brownfield site of the existing depot and in Sardoba district on a greenfield site adjacent to the existing depot. The site selection process for the gin plants was driven by the presence of access roads and technical possibilities to connect to electricity grids, gas supply, water and wastewater utilities.

Map 1.4: Gin site in Kasbi district

Source: FE “Indorama Agro” LLC

Map 1.5: Gin site in Sardoba district

Source: FE “Indorama Agro” LLC

Source: FE “Indorama Agro” LLC

Source: FE “Indorama Agro” LLC

Each ginning facility will occupy a total area of approximately 12 ha as detailed in the table below. This land was acquired under Phase I land acquisition process and no additional land is required for construction or operation of the gin plants.

Table 1.8: Ginning facility components and land requirement

Kasbi Gin Plant	m^2	Sardoba Gin Plant	m^2
Main ginning	4,854	Main ginning	4,854
Bale garden	3,850	Bale garden	3,850
Seed storage	1,900	Seed storage	1,900
Total constructed	10,604	Total constructed	10,604
Raw cotton storage in open	110,000	Raw cotton storage in open	110,000
Total area	**120,604**	**Total area**	**120,604**

Source: FE “Indorama Agro” LLC

1.2.2.3 Farm Depots

Seven farm depots will be rehabilitate/constructed across the Project footprint to facilitate agriculture operations of the Company. These farm depots will accommodate warehouses for fertilizers and chemicals, storage facilities for harvested cotton and wheat, parking areas and workshop for machinery and equipment and the operational office premises. A total area of 52 ha will be purchased by the Project.

Table 1.9: Farm depots land requirement

Site	Sub-district / District	Site area
Farm depot 1	Sh. Rashidov – Sardoba district	9 ha
Farm depot 2	Bobur – Oqoltyn district	5 ha
Farm depot 3	Temur malik – Sardoba district	9 ha
Farm depot 4	Toirov – Oqoltyn district	8 ha
Farm depot 5	Nuristan – Nishon district	9 ha
Farm depot 6	Gulistan – Nishon district	7 ha
Farm depot 7	Fazli – Kasbi district	5 ha
Total area		**52 ha**

Source: FE “Indorama Agro” LLC

All farm depots are existing brownfield sites and the process of land acquisition is expected to be completed by the end of March 2020.

1.2.2.4 Residential Complexes in Karshi and Gulistan

As part of the Project, the Company will construct two residential complexes in Karshi and Gulistan to accommodate staff and families working in Kashkadarya and Syrdarya branches respectively and recruited from other regions of Uzbekistan or abroad. Both residential complexes will be located within the existing boundaries of Karshi and Gulistan as depicted in the maps below.

Residential complexes will be connected to centralised water and wastewater disposal systems of Karshi and Gulistan respectively.

Map 1.6: Residential complex in Karshi

Map 1.7: Residential complex in Gulistan

Source: FE “Indorama Agro” LLC

Source: FE “Indorama Agro” LLC

Each residential complex will be designed to accommodate 80 residents in total.

Table 1.10: Capacity of residential complexes (in each complex)

Type of accommodation	Total units	Auxiliary Facilities
Batchelors single apartments	16	A gym, pantry, common services, dining, laundry, etc. and guest house area
Family apartments	16	
Directors apartments	2	
Guest rooms	6	
Total	**40**	

Source: FE “Indorama Agro” LLC

Both residential complexes will be managed by the Company’s own staff. It is estimated that 10 people will be required to operate and maintain these facilities. Each residential complex will occupy an area of approximately 2,25 ha. Estimated lifetime of complexes is 50 years.

National Approvals Status of the Project Components

Construction of the gin plants, water and drainage channels rehabilitation and land reclamation works are subject to the national Environmental Impact Assessment (**EIA**) process and the Project obtained approval of the Draft Statement on Environmental Impact from the State Environmental Expertise (**SEE**) (refer to Section 2.1.4) for the detail on the national EIA process). The Statement on Environmental Consequences will be required for the gin plants only and it will be completed by the Project prior to commissioning (in August 2020)… Field works performed by FE “Indorama Agro” LLC to the date, such as field levelling, do not require any spatial approval from the environmental authorities.

Feasibility Studies for two residential complexes have been completed including hydrogeological site surveys and the Project obtained SEE approval of the Draft Statement on Environmental Impact. No other environmental approvals are required for the residential complexes.

1.2.3 Project Processes and Technologies

1.2.3.1 Crop Production Life Cycle

The cotton production cycle in Kashkadarya involves the following agrotechnical operations: (1) soil ploughing and (2) land levelling, (3) ridging, (4) pre-plant irrigation, (5) planting, (6) fertilizer application, (7) herbicide application and (8) insecticide application, (9) inter-raw cultivation, (10) irrigation, (11) topping, (12) defoliation and (13) harvesting. The cotton production cycle in Syrdarya differs slightly due to local conditions and apart

from soil ploughing and land levelling also includes the establishment of basins, salt leaching, levelling of basins' hills, chiselling and harrowing.

The production cycle for winter wheat is similar in both regions and includes: (1) fertilizer application, (2) soil deep loosening, (3) ridging by cultipacker and (4) planting on ridges, (5) post-plant irrigation, (6) fertilizer application, (7) irrigation (3-5 times), (8) herbicide application, (9) insecticide application, (10) fungicide application and (11) harvesting.

Agrotechnical operations for mungbean production are similar with less irrigation after planting (2-3 times only).

Primary soil treatment before planting of cotton will be undertaken during the winter-spring period from November to April followed by harvesting of cotton bolls in September-October. The life cycle of wheat and mungbean production will require less time: from November to June for wheat and from June to October for mungbean. The proposed scheme of crops rotation will have a positive impact on the soil quality, in particular it will increase the concentration of organic and inorganic matter and reduce the salination of plots.

FE "Indorama Kokand Textile" JSC will be the offtaker with up to 100% of its raw material requirement in the cotton produced by the Project. Any additional cotton produced by the Project may be sold at the commodity exchange to domestic end users. Wheat will be sold on the commodity exchange at prevailing prices in Uzbek Soums (**UZS**). The legumes will be exported in US Dollars to buyers in China and India in the well-established markets.

1.2.3.2 Cotton Breeding Programme

The farming model proposed by FE "Indorama Agro" LLC is based on scientific studies and good international farming practices from Australia, the USA and Brazil (where cotton farming is well developed). The Company hired experienced farm managers, agronomists, seed breeders, technical experts, redevelopment specialists for soil and irrigation improvements and other related specialisation required for the Project from Australia and India, to be on the ground implementing, supervising and monitoring the Project progress and implementation of best practices.

In 2019 the Company launched the Cotton Breeding Programme for a period of eight years with the objectives to:

- Increase cotton fibre yields
- Improve cotton fibre quality
- Influence plant maturity
- Strengthen resistance to diseases
- Breed region specific and widely adapted varieties
- Strengthen resistance to biotic and abiotic stresses
- Improve seed size and quality.

The Breeding Programme includes four major phases.

Table 1.11: Breeding Programme phases

Phase I	Phase II	Phase III	Phase IV
Assessment and Germplasm Identification	**Artificial Hybridisation**	**Segregating Generations and Selection**	**Testing and Seed Production**
Identify needs of the regions, assess current varieties to identify any deficiencies (e.g., a lack of disease resistance, deficiencies in fibre quality	The process of "crossing" the identified parents and bring together the genes of desirable attributes into a new genetic population that can be selected.	In early generations select the progeny of crosses with the aim to remove the most undesirable or inferior genotypes,	Establish the potential of any new genotypes over existing varieties, bulk up sufficient qualities of seed and finally commercial release of a new

Phase I	Phase II	Phase III	Phase IV
traits, the need for increased yield potential, etc.). The Information is used to collect the genotypes that have the required attributes. Genotype assessment processes include screening available germplasm collections, sourcing genotypes from other breeders (material exchange agreements), searching germplasm collections for accessions (germplasm banks), and import of new and specific germplasm.	The aim is to identify and cross parents that will create populations that have the desired new combination of traits.	progressively moving towards a smaller number of elite lines. This is the largest part of a breeding programme and involves identifying the products of genetic segregation and recombination to find the "best of the bunch" as reliably and quickly as possible, while minimising the risk of failing to retain a superior line.	variety. Only a small number of advanced lines remain each year, they are evaluated in an extensive field trial programme at multiple locations. Selections surviving to the end of this programme become commercial. This last phase also consumes significant breeding resources. Breeders constantly face the dilemma of wanting varieties released as quickly as possible while still having reliable data to support a variety's regional performance and its performance over arrange of years.

Source: FE "Indorama Agro" LLC

After 2 years of internal trials the Company will initiate a commercialisation programme as first superior crossbreeds may be identified at 2022 harvest (from variety reselection) or in 2023 (from first crosses). Trials will be taken on the land parcels which are allocated to FE "Indorama Agro" LLC and will be closely monitored for selecting better varieties of seeds.

During the third year of research larger scale demonstration trials will take place on the fields of FE "Indorama Agro" LLC. Plot trials will provide performance results using larger scale agronomic and crop management practices (large planters, mechanical harvesting, commercial ginning, etc.). Successfully trailed and tested seed breeds will only be recommended to farmers once the Project is confident that they may provide better productivity and may bring economic benefit from each hectare. By following this approach, a limited commercial use will be achievable by 2024. From the 2025 harvest onwards the Breeding Programme will be mature and potentially have new advanced lines to consider for advancement every year.

The Project will use specialist breeding technologies in delivering the Cotton Breeding Programme:

- Marker Assisted Selection – a molecular breeding tool to check for genetic inclusion of genetic traits
- Molecular Breeding Techniques – to identify and transfer new and unique genes from other distant plant relatives or related pieces within the same genus.

1.2.3.3 Irrigation methods

Currently Uzbekistan is using Hydro Module Zones (**HMZ**) dividing the irrigated areas into nine zones. Each HMZ has a set of crop-specific recommendations for irrigation, based on soil characteristics (thickness of soil layers, soil texture) and depth of groundwater table as described in Table 1.12.

Table 1.12: Hydro Module Zones in Uzbekistan

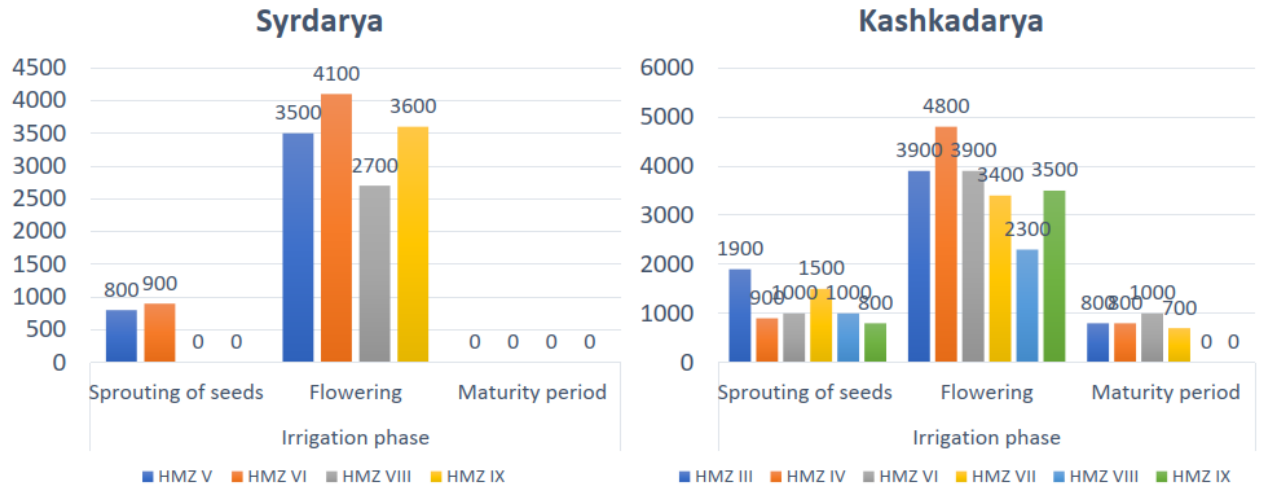
HMZ Characteristics	HMZ
Automorphic soils (ground water level at > 3 m)	
Thin (0.2-0.5 m) medium stone of various granulometric composition on sand and pebble deposits and gypsum, and sandy	I
Moderate lightly stone of various granulometric composition on sandy - pebble deposits and on gypsum powerful sandy and light loamy	II
Medium and heavy loam and clay	III
Semi-hydromorphic soils (ground water level at 2-3 m)	

HMZ Characteristics	HMZ
Thin sand and sandy, as well as low and medium thickness of different particle size	IV
Thinly light and medium loamy homogeneous; heavy loamy	V
Thin heavy loamy and clayey dense, homogeneous, different in granulometric composition, layered in structure	VI
Hydromorphic soils (ground water level at 1-2 m)	
Fine sandy and sandy, as well as medium-sized, of various granulometric composition	VII
Thin light and medium loamy homogeneous; heavy loam	VIII
Thin heavy loamy and clayey dense, homogeneous, different in granulometric composition, layered in structure	IX

Source: FE “Indorama Agro” LLC

At cotton fields the Project is using irrigation regimes for HMZ III to IX depending on the crop phase and the region (Figure 1.1).

Figure 1.1: Project irrigation regimes, m³ of water



Source: FE “Indorama Agro” LLC

The Project will use the existing irrigation infrastructure as detailed in Sub-section 1.3.1 below.

Modern irrigation methods will be applied to increase crop yields:

- Syphon irrigation
- Flume irrigation
- Pivot irrigation.

Current cotton yield in the Project area is 2-2,5 t/ha. The Project is targeting 5 t/ha of cotton by 2023 to eventually reduce the land area by two times while producing cotton in quantities that satisfy the demand of the Company.

1.2.3.4 Crop Production Plant and Machinery

The Project will use machinery and equipment in the crop production cycle to automate and mechanise key farming operations:

- Soil preparation

- Planting
- Crop protection and plant nutrition management, and
- Harvesting

Where appropriate machines to be procured by the Project will be GPS-equipped and will be managed by FE "Indorama Agro" LLC staff.

Table 1.13: Purchase of plant and machinery for crop production

Machinery	Origin	Quantity		Machinery	Origin	Quantity	
		1st year operation	2nd year operation			1st year operation	2nd year operation
Cotton Production				**Wheat and Mungbean Production**			
Large 4-wheel tractors	USA	4	8	Prime movers	Uzbekistan	8	8
Tractors	USA/Germany	66	38	Grain planters	USA	-15	
Trailed scrappers	USA	4	8	Combine harvesters	USA	-	8
Row fertilizers	Tbc	-	16	Chaser bins	USA	-	8
Row rippers	Australia	16	8	Grain trailers	USA	-	12
Row cultivators	USA	20	16	Silos	Turkey	-	4
Row planters	USA/France	30	24				
Fertilizer spreaders	France	8	6				
Cultipackers	Australia	8	12				
Row pickers	USA/China	28	4				
Modulers makers	Australia	8	6				
Round modules	Australia	4	3				
Spray rigs	Brazil	4	4				
Row mulchers	Australia	8	8				
Row root cutters	Australia	-	8				
Front-end loaders	UK	6	6				
Excavators (long)	UK	6	-				
Excavators (middle)	China	6	-				
Excavators (small)	China	6	-				
Backhoes	China	-	4				
Road graders (large)	Germany	4	-				
Road graders (small)	Germany	2	2				
Low bed trailers	Turkey	8	8				
Delivers	Australia	4	4				
Trailed sprayers	Holland	8	10				
Row averages	Australia	28	4				
Monosem transport trolleys	France	26	-				
Levellers	Australia	4	4				

Machinery	Origin	Quantity		Machinery	Origin	Quantity	
		1st year operation	2nd year operation			1st year operation	2nd year operation
Graders	Australia	4	4				
Oil tankers	Uzbekistan	12	-				
Compressors with generator	Germany	17	-				

Source: FE “Indorama Agro” LLC

The Project will promote digital mechanized production management via digital machine and fuel control, autopiloting/parallel driving and overlaps control, yield digital mapping and management zones, using machinery offering variable rate application of fertilizers, seeds, pesticides and introduction of automated machinery operations, labour and field operations control.

With mechanized harvesting the Project will obtain clean cotton as:

- Application of defoliants and boll openers minimises trash during mechanical harvesting and allows harvesting to be completed in one go
- Modern harvesters with high quality spindles do not damage the fibre quality
- Mechanical harvesting prevents contamination that can occur during manual picking when contaminants can accidently be introduced (fabrics, plastics, hair, etc.).

1.2.3.5 Ginning

The gin plants will process both types of cotton – for technical consumption and for breeding seeds:

- The seeds for technical consumption after separation from the fibre can be processed in the seed crusher to extract oil. This type of seeds does not require seed delinting. The seeds can be sold on commodity exchanges with good demand due to the increased consumption of cotton seed oil by the population.
- Seeds for planting are subject to delinting and chemical treatment (with insecticide and fungicides).

Photo 1.1: Sample gin plant

Source: FE “Indorama Agro” LLC

Photo 1.2: Gin stands

Source: FE “Indorama Agro” LLC

The ginning plants will procure US technology. The ginning process includes the following key operations: (1) feeding, (2) cutting plastic coverage (3) unwrapping of the cotton modules, (4) flow of cotton, (5) cotton drying (to 5% moisture level), (6) pre-cleaning, and (7) seed separation in saw gins.

Ginning outputs and material balance are described in Table 1.14.

Table 1.14: Ginning material balance

Output	Application	% of Input
Cotton seeds	For planting and oil / cake for animal feed	45%
Cotton fibre/lint	For spinners	37%
Waste	To be returned back to the fields	13%
Linter	To be used for pulping (paper)	5%

Source: FE “Indorama Agro” LLC

After the saw gins, the cotton seeds are delivered via auger to a storage facility at the gin site.

Clean fibre/lint is fed to a condenser to add back moisture to 7.5% and then delivered to a bale press for wrapping bales. Ready bales are moved to a storage facility at the gin plant and prepared for shipment to the offtaker (FE “Indorama Kokand Textile” JSC).

The Project will establish a bale quality control and tracking system.

The ginning plants will be equipped with a suitable fire extinguisher system.

1.2.3.6 Delinting and Seed Treatment Facilities

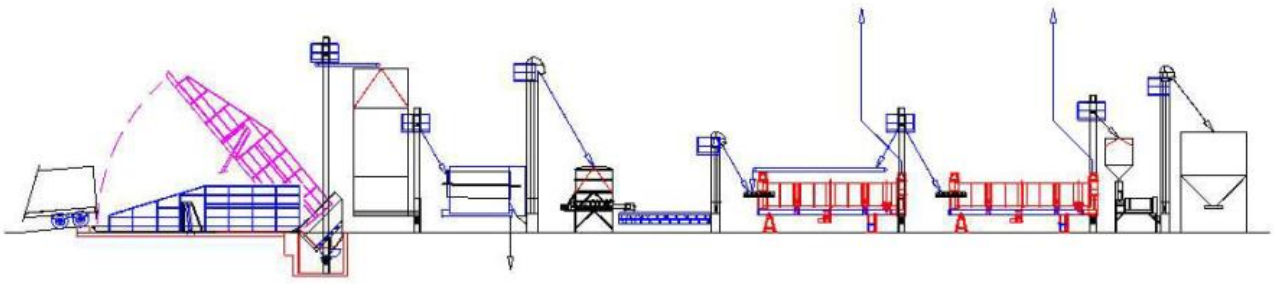
Seed for planting will be treated using the acid delinting process to remove residual lint and separate foreign particles and track from the seed stock.

The Project will apply Continuous Flow Delinting technology (Figure 1.2).

The process involves eight steps:

- Step 1: Acid is applied to seeds
- Step 2: Seeds are exposed to high temperature (200°C)
- Step 3: Seeds are exposed to lower temperature (40°C)
- Step 4: Acid is neutralized
- Step 5: Seeds are calibrated using sieves
- Step 6: Seeds are stored in a bin
- Step 7: Chemical treatment of seed using cruiser chemical (thiametoxam + mefenoxam + fludioxonil)
- Step 8: Seeds packaging

Figure 1.2: Continuous Flow Dilute Sulfuric Acid Delinting process diagram



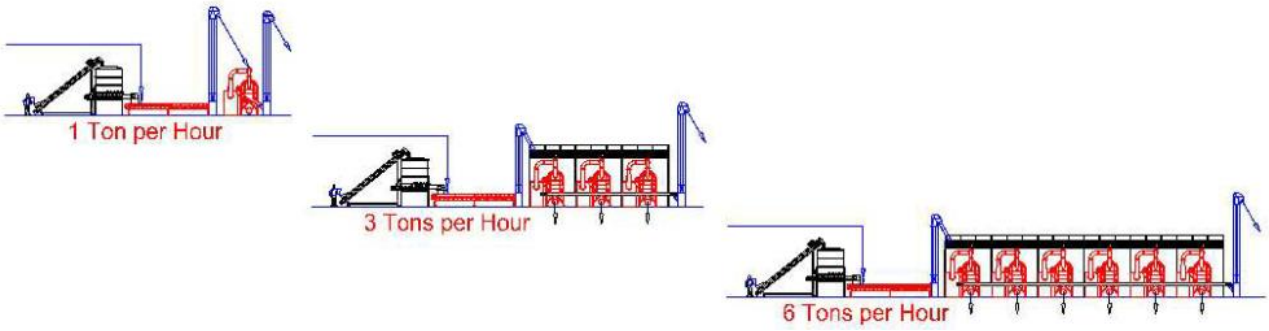
Source: http://www.americandelinting.com/Sulfuric_Acid_Delinting.html

Delinting

Bulk Cotton Seed arrives from the gin in trailers that are unloaded into a bulk feeding mechanism. Seed is fed into a bulk storage bin and held until processing begins. Pre-cleaning begins in a Scalping Cleaner which then supplies seed to the Metering Bin and Acid Application Chamber. Acidized seed continuously flows through a Drying drum and then to the Buffing drum. Black seed from the Buffing drum is transferred for storage in the Black Seed Storage Bin.

Metered and acidized seed is fed into the Batch Delinting Machine (Figure 1.3). When the first Batch Delinting Machine is full, flow from the Acid Application Chamber is diverted to the next Batch Delinting Machine until all are filled. The Batch Delinting Machine dries the moisture from the Acid Mix Solution and buffs the residual lint away from the seed. Delinted seed is discharged from the first Batch Delinting Machine and then it is filled again. The second Batch Delinting Machine will discharge as the first is filled again. The sequence is repeated.

Figure 1.3: Batch Delinting Machine



Source: http://www.americandelinting.com/Sulfuric_Acid_Delinting.html

One 1-ton-per-hour-machine will discharge black delinted seed once per hour. When operating 6 Batch Delinting Machines, a continuous flow of the six batches is achieved.

Acid Mix Solution is blended in the Acid Mix Station. Fuzzy seed is metered into the Acid Application Chamber where a precise recipe of acid, water and surfactant are mixed with the fuzzy seed.

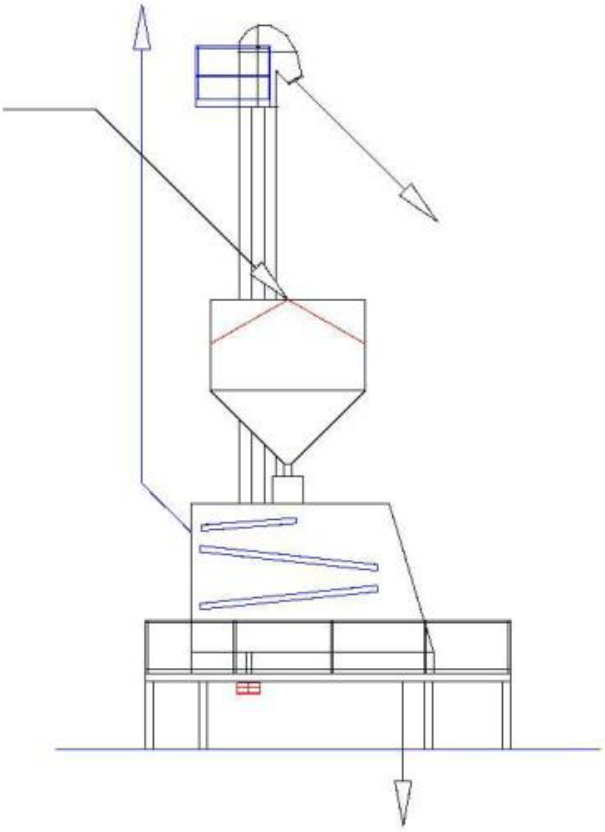
Cleaning

Delinted cotton seed is fed through an air / screen cleaner (Figure 1.4). Seeds move across perforated vibrating screens with various openings. In the cleaner, air is introduced to carry away the light particles. The air steam removes the dust and light trash. Sticks, heavy trash and cull seeds are separated from the good seed through the screen perforations.

Gravity Separation

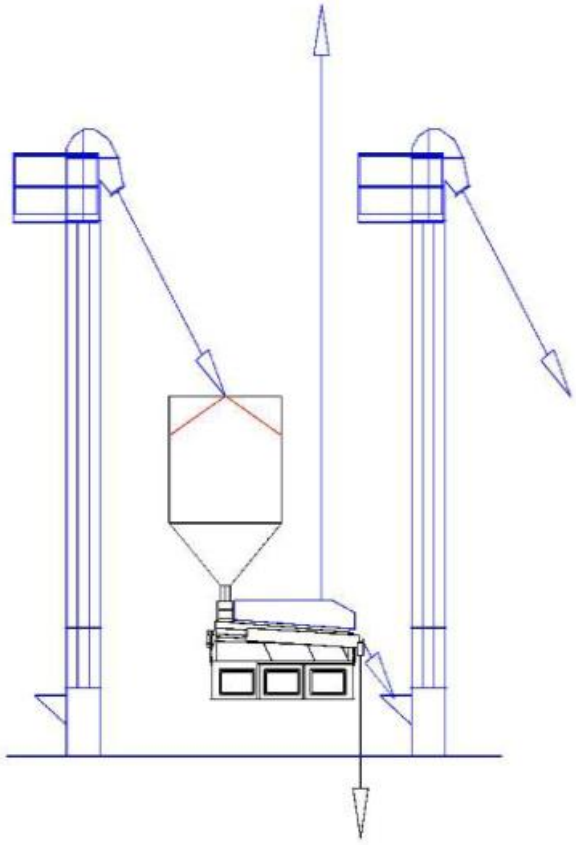
The gravity table separates the seeds by density. The immature and cracked seeds are lighter and gather at one outlet of the table (Figure 1.5). Heavier seeds are most likely to successfully germinate and are accumulated at the upper end of the table. Air flow allows the seed bed to float thereby reducing friction. The vibrating action of the table steers each seed to the proper outlet.

Figure 1.4: Cleaner



Source:
http://www.americandelinting.com/Sulfuric_Acid_Delinting.html

Figure 1.5: Gravity table



Source:
http://www.americandelinting.com/Sulfuric_Acid_Delinting.html

1.2.3.7 Storage facilities, mechanical workshops and parking yards

The Project will rehabilitate and construct storage facilities, mechanical workshops and parking yards at the existing four brownfield sites of former depots/cotton collection points.

Storage facilities will be used to store equipment and fertilizers, grain and cotton to be procured from contract farmers.

1.2.3.8 Land levelling, reclamation and desalinization

To improve the existing farming conditions, FE “Indorama Agro” LLC has undertaken extensive land re-development. Land laser levelling and fields re-shaping improve crop management and reduce water consumption.

The Project will increase organic matter and improve soil structure via residue mulching techniques and eliminating the practice of burning residual crops in the fields. This approach will improve water holding capacity and fertility of soils.

1.3 Existing Operations and Infrastructure

1.3.1 Irrigation Infrastructure

The Project is using the existing irrigation infrastructure, including ground ditches, concrete canals, irrigation flumes (lotoks), water pipes, wells, pumps and water access points along the main canals.

The system in general needs to be refurbished. Most irrigation canals require rehabilitation works (desilting and cleaning) and few need improvements (installation of new gates to regulate water flow). Irrigation flumes are often heavily damaged and unsuitable for use (Table 1.15).

Table 1.15: Irrigation flumes subject to rehabilitation

Region	District	Rehabilitation needs, length
Kashkadarya	Kasbi	42%
	Nishon	46%
Syrdarya	Sardoba	44%
	Oqoltyn	97%

Source: FE “Indorama Agro” LLC

1.3.2 Drainage Infrastructure

The Project is using the existing drainage infrastructure that includes collectors, open drainage ditches and underground pipes

The existing drainage networks are deteriorated and require rehabilitation. Repairs and rehabilitation works are on-going and were completed by the Company in part in collector networks and closed-horizontal underground pipes in Kasbi and Sardoba districts in 2019 and 2020.

1.4 Associated Facilities

Connection of the new ginning facility in Sardoba district to the grid will require construction of a 5 km power transmission line (PTL).

Map 1.8: Power Transmission Line project route

Source: FE “Indorama Agro” LLC

The 35 KV, 5,000 KVA PTL will be constructed by Uzbeknergo. The construction period is estimated to take 3 months. The PTL will supply electricity from the substation located near of the old cotton storage adjacent to the Gulzor settlement. The PTL route will cross fields currently leased by the Company and no farmers will be impacted by the construction phase.

The PTL construction is categorised as an associated project and is considered in the ESIA study.

The associated project will be controlled jointly by the Company and Uzbekenergo and is subject to the EIA process, which shall be initiated and completed as part of the national approval process.

1.5 Need for the Project

Currently, Uzbekistan is the world’s sixth-largest cotton fibre producer (about 900,000 tons per year) among 90 cotton-growing countries. Uzbekistan used to grow three million tons of raw cotton annually and produced about one million tons of cotton fibre. Traditionally raw cotton and cotton products are key export earners bringing about $1 billion a year. Cotton production has declined in recent years to below three million tons annually and more land is used to grow vegetable crops, orchards and vineyards. In 2017 the Government of Uzbekistan declared[9] its intention to abandon the export of cotton fibre by 2020 to fully process it within the country and export finished products only.

Since mid-2000s, international companies have been investing in the textile production in Uzbekistan. The Government of Uzbekistan puts efforts in addressing the issue of preferential and transparent access to good quality cotton fibre. The project of establishing cotton farming clusters across the country will enable investors to get access to high-quality raw materials.

[9] Decree of the President of the Republic of Uzbekistan dated December 21, 2016 No..PP-2687 “On the Programme of Measures for the Further Development of the Textile, Garment and Knitting Industry for 2017-2019”

FE “Indorama Kokand Textile” JSC started operations in the country in 2010 and is now one of the largest cotton processing companies in Uzbekistan. Indorama has been included in the Resolution of the Cabinet of Ministers of Uzbekistan “On Further Measures to Develop Cotton and Textile Industries” No.230 of 19.03.2019 as well as Resolution No.632 dated 8th August 2018 “On measures to create the modern cotton-textile cluster by the company "Indorama" (Singapore) in the Republic of Uzbekistan” to develop the cluster scheme of cotton fibre production in Kashkadarya and Syrdarya regions of Uzbekistan and expand cotton goods production.

The Project will contribute to the implementation of the 2020-2024 National Strategy for Developing Textile, Garment and Knitwear Goods Industry in Uzbekistan targeting *inter alia* the expansion of cotton fibre processing, increase in cotton goods production and the overall transformation of the country into a leading textile producer in Central Asia.

The Project will also bring strong added value and know-how to the country in terms of transforming the current farming practices, enhancing yields and getting good quality cotton fibres from a world-class ginning plants and controlling the entire cotton supply chain thus establishing good industry practice and enabling the country to reach world markets, which have not been accessible until now.

The Project has already been acknowledged in various public forums and in the Parliament (Oliy Majlis) as a good example of how Indorama is investing efforts to bring good farming practices into the country.

1.6 Alternatives Analysis

Two regions, Kashkadarya and Syrdarya, have been selected by the GoU for the Project as traditionally specializing in the cotton sector. The majority of the local population (over 57%) in the Project regions lives in rural areas and depends, at least in part, on cotton farming for their livelihoods. Moreover, the cotton sector in Uzbekistan has faced long-standing criticism for systematic use of child and forced labour and is associated with high water usage and severe deterioration (salination) of soils. The Project is planned and designed to respond to these challenges.

Indorama with the support from IFC’s Advisory Team completed a Feasibility Study in 2018 to (i) confirm that the proposed regions are suitable for modern cotton farming, (ii) understand local advantages and disadvantages and (iii) select districts for cotton farming. A summary of key findings is described in the table below.

Table 1.16: Feasibility Study findings for selecting Project locations

Parameter	Kashkadarya region	Syrdarya region
General Characteristics		
Climate	Annual precipitation rate is 150-500 mm: • 350-500 mm in the northern sub-region • 200-350 mm in the central sub-region • 150-200 mm in the southern sub-region Mostly falling in the winter-early spring period.	Annual precipitation rate is 130 to 260 mm in a flat area. Mostly falling in the winter-early spring period.
Soils	• Typical sierozem soil (SOM=0.8-1.0) in the northern sub-region • Light coloured sierozem soil (SOM=0.7-0.8%) in the central sub-region • Takyr soil (SOM=0.5-0.6%) in the southern sub-region	Meadow, meadow-sierozem and sierozem-meadow soil types with SOM=0.5-1.0% (with low to moderate soil fertility)
Major crops	Cotton and winter wheat (both irrigated)	Cotton and winter wheat in rotation (both irrigated)
Advantages of Cotton Production		
Climatic conditions	• Favourable to grow both upland and fine staple cotton (average daily max t = 29^0C (July), min t = 2.6^0C (January). • Sum of effective temperatures (days with daily t > 10^0C) is Σ=2,900^{0}C (Karshi) while upland	• Agricultural crops including cotton are mostly grown in the old irrigated sub-zone where the climatic and soil conditions are appropriate for growing upland cotton (average daily max t = 29^0C (July), min t = 2.2^0C (January).

Parameter	Kashkadarya region	Syrdarya region
	cotton requires not less than Σ=2,000^{0}C and fine staple cotton requires above Σ=2,500^{0}C.	• Sum of effective temperatures (days with daily t > 10^{0}C) is Σ=2,412^{0}C (Syrdarya) while upland cotton requires not less than Σ =2,000^{0}C.
Cotton varieties	• Upland cotton cv: Bukhara-6, Bukhara-8, Bukhara-102, Namangan-77 and Porlok-4 • Fine-staple cotton cv: Kashkadarya-1 and Kashkdarya-5 (seed multiplication in 2017) elaborated and adopted to the soil and climatic conditions of the region.	Upland cotton cv: AN-Bayaut-2, Sulton, C-6524, Bukhara-102, Porlok-1 elaborated are adopted to the soil and climatic conditions of the region.
Vegetation period	Long vegetation period allows to obtain two to three yields per year (winter wheat + maize + cabbage/onion). Number of days with t > 10^{0}C = 239 days, t > 15^{0}C = 190 days.	The vegetation period allows to obtain two yields per year (winter wheat + summer crop). Number of days with t > 10^{0}C = 219 days, t > 15^{0}C = 173 days.
Location	Upstream of the Amu Darya River	Middle stream of the Syr Darya River.
Availability of the workforce	Temporary workforce is available for seasonal works and cotton hand picking	-
Disadvantages of Cotton Production		
Soil salinity	Soil salinity (slightly to moderate) requires leaching of salts	Soil (light, moderate to heavy) salinity in 100% of the cropping area requires the leaching of salts. need for intensive land reclamation in some cotton production areas.
Water storage	Irrigation water shortage happens in central sub-zone.	-
Limited labour	-	Labour is very limited for seasonal work and hand cotton picking. Cotton harvesting with combines is needed.
Recommendations	Cotton production is most favourable in the northern sub-region (Shakhrisabz, Yakkabog and Chirokchi districts) and southern sub-region (Kasbi, Karsi and Koson districts) due to water and labour availability, better soil fertility.	Cotton production is more favourable in the old irrigated zone (Syrdarya, Gulistan, Saykhuobod, Oqoltyn and Bayaut districts) where soils are less saline (slightly to moderate levels) compared to the newly irrigated zone with heavily saline soils in prevailed areas (the gypsum layer is thick and close to the soil surface, the water table is very shallow (0.4 to 1.0 m).

Source: FE “Indorama Agro” LLC

Based on recommendations of the Feasibility Study four districts were selected for cotton farming: Kasbi and Nishan both located in the southern part of Kashkadarya region and Oqoltyn with adjacent Sardoba district in the old irrigated zone of Syrdarya region.

1.7 “No Project” Alternative

The “No Project” option considers the scenario where the Sponsor does not establish modern cotton farming and production in the Kashkadarya and Syrdarya regions of Uzbekistan. In the absence of the Project, two main scenarios are possible:

1) Continuation of the status quo. Private farms will continue operation on leased land using old techniques, old and deteriorated infrastructure, continuous investments in land rehabilitation and low incomes resulting from low yields and existing loan debts. This option appears to be unlikely due to the widespread reform of the cotton sector in Uzbekistan.
2) An alternative organisation would take the opportunity to develop the cotton clusters in line with GoU policy. In this scenario, the alternative organisation could potentially proceed with funding from sources other than International Finance Institutions, possibly from a bi-lateral source.

Socio-economic Perspective

From the socio-economic perspective the first “No Project” option would continue the economic hardship in the Project area from high levels of unemployment and underemployment. There would be a continued decline in the cotton sector with associated loss of employment opportunities.

The first “No Project” alternative will not make it possible for local farmers to get access to Project benefits of knowledge sharing and training, however it should be acknowledged that not all farmers and people impacted by the Project will be able to take advantage of these opportunities. Neither the Project staff nor the local farmers will be able to acquire new skills or upgrade the existing ones. The local farmers will not be able to understand modern cotton farming practices, test and adapt new cropping techniques and will continue their operations under the existing quota system with the support from the government and limited financing available for future development. The second “No Project” alternative would enable some of these benefits to occur but would not present the livelihood restoration and other advantages that the “Project” does.

In the second “No Project” scenario, carrying out the project without the backdrop of the environmental and social requirements of the IFC and EBRD could mean that workers’ rights are not given as much attention and protection, and prevailing violations such as employment of child and forced labour continue longer into the future (notwithstanding the significant efforts of the World Bank, ILO, IFC and civil society in this regard). Other key health, safety and environment standards may not be as stringent or monitored in as much detail, resulting in poorer outcomes for workers, communities and the environment.

Environmental Perspective

From the environmental perspective, the “No Project” alternative will prevent investments in the existing irrigation system, which is out of date, heavily deteriorated and needs rehabilitation. There would be no reduction in water losses and no improvement of water management practices through targeted water application, reduction of water transmission losses, better irrigation scheduling, changes in the fields configuration and reduction in soil salinity and, as a result, no reduction in water consumption from Syrdarya and Amu Darya rivers for irrigation.

There will be no reduction of adverse soil and biodiversity impacts as chemicals and pesticides will continue to be applied inefficiently in the Project area contaminating soil, groundwater and adjacent habitats. There would be no improvement in the use of fertilizers, and no shredding and ploughing of crop residuals into the soil will so the soil quality, fertility and capability (organic matter, structure, etc.) will deteriorate and impact the cotton production.

No investments in the Breeding Programme, as proposed by FE “Indorama Agro” LLC, will fail to improve the quality of seeds and will not be able to offer the varieties that may increase yields and crop resistance to pests, thus reducing application of pesticides and adverse impacts of soil and ground water.

The second “No Project” alternative in line with GoU policy can involve investors with low environmental responsibilities, which will increase impacts from the excessive use of pesticides and fertilizers, including damage to soils, groundwater, receiving water bodies and neighbouring habitats. In addition, poor yield in result of usage of outdated methods and machinery can support involvement of pastures and undisturbed habitats in crop rotation.

Conclusion

The overall conclusion is that the “No Project” alternative would not satisfy the wider objectives aimed at the sustainable development and reforming the cotton sector of the country. Only responsible and sustainable economic development of initiatives such as the proposed Project can address pressing issues of environmental and social concern. The “No Project” alternative is therefore not considered to represent the most efficient option for employing the agricultural potential of Uzbekistan.

Not developing the Project would result in the benefits noted above not being realised. Furthermore, lack of capacity (that the Project intends to build up) to control the entire cotton supply chain will not enable Uzbek cotton reach world markets, which have not been accessible until now.

1.8 Project Category

The EBRD and IFC has categorised the Project as “A” based on their respective E&S policies.

A project is categorised A when its implementation may result in potentially significant future environmental and/or social impacts that are diverse, irreversible or unprecedented. Typically, these projects may affect an area broader than the sites or facilities subject to physical works and therefore the project will require a comprehensive environmental and social impact assessment to international standard including stakeholder engagement and disclosure of ESIA findings to the general public and key project stakeholders.

The Project categorisation is driven by (i) the large geographical footprint of the proposed farming scheme, the associated land re-allocation process and potential for economic displacement, (II) the vulnerability of water resources in the Project area and other environmental risks associated with cotton farming (iii) labour risks in a sector and country until recently associated with child labour and still associated with incidents of forced labour.

The ESIA study has reviewed the nature and scope of the Project, determined and completed required E&S investigations, assessed impacts and risks, identified mitigation, management and monitoring actions and recommended information disclosure and stakeholder engagement measures as detailed in the ESIA Report.

2 Legal Requirements and International Standards

2.1 National Legal and Institutional Framework

2.1.1 National Environmental and Social Policy

The RoU has established the national environmental legal and institutional framework, governed by the Nature Protection Policy and national guidance on measures to promote sustainable use of natural resources and protect environment. These are based on the following key principles:

- Integration of economic and environmental policies aimed at preserving and restoring the environment as a prerequisite for improving the living standards of the population;
- Transition from the protection of individual natural elements to the general and comprehensive protection of ecosystems;
- Responsibility of all members of the society for environmental protection and biodiversity conservation.

The country is a party to a number of international and regional environmental agreements and conventions.

Central among these principles is the priority of protecting human life and health. The RoU Constitution and environmental legislation establish the right of citizens to a safe environment. The national legislation provides for a number of other environmental rights and obligations of citizens, which may be exercised through individual or public environmental protection efforts.

2.1.2 National Environmental Legal Framework

The following key law form the national environmental legal framework of Uzbekistan as described in the table below.

Table 2.1: Key environmental laws of Uzbekistan

Year	Law / Regulation	Recent Amendments
08.12.1992	Constitution of Uzbekistan	16.04.2014
09.12.1992	Law “On nature protection”	18.04.2018
06.05.1993	Law “On water and water use”	23.07.2018
25.05.2000	Law “On Environmental Expertise”;	14.09.2017
03.12.2004	Law “On Specially Protected Areas”	14.09.2017
26.12.1997	Law “On protection and use of flora”	21.09.2016
26.12.1997	Law “On protection and use of fauna”	19.09.2016
27.12.1996	Law “On air safety”	14.09.2017
05.04.2002	Law “On wastes”	10.10.2018
12.11.2013	Law “On Environmental Control”	12.11.2013

Source: Ecostandart Expert

These key laws are briefly summarised below:

- **RoU Constitution**, articles 50, 54, 55, 93, 100. Article 55 of the Constitution of the Republic of Uzbekistan states: Land, its subsoil, water, flora and fauna and other natural resources are national treasures and are subject to rational use and protection by the State
- **The Law "On Nature Protection"** of December 9, 1992 (as amended on 18.04.2018) establishes the legal, economic and institutional framework for environmental protection, ensures sustainable development and certain principles, including the State Environmental Expertise (SEE). Article 12 of the Law "On Nature Protection" states: “Residents of the Republic of Uzbekistan are obliged to use natural resources rationally, treat natural resources with care, and comply with environmental requirements”
- **The Law “On Water and Water Use”** of May 6, 1993 (as amended on 23 July 2018) provides for the rational use of water resources, protection of water resources, prevention and mitigation of negative impacts and compliance with national legislation
- **The Law "On the Protection and Use of Vegetation"** of December 26, 1997 (as amended on September 21, 2016) regulates relations in the field of protection and use of vegetation (plants) growing in natural conditions, as well as wild plants for their restoration and genetic conservation
- **The Law "On Protection of the Atmospheric Air"** of December 27, 1996 (as amended on September 14, 2017) defines the issues of preservation of the natural state of the atmospheric air; legal regulation of the activity of state bodies, enterprises, institutions, organizations, public associations and citizens in the field of protection of the atmospheric air
- **The Law "On State Land Cadastre"** of August 28, 1998 contains the basic rules and regulations for land use and provides for land rights. The Law sets the environmental value of land plots and ecosystem services
- **The Waste Act** (2002) (as amended 10.10.2018) regulates waste management and empowers the State Environmental Committee to inspect, coordinate, assess the environment and establish certain parameters for those places where waste can be disposed of
- **The Law "On Subsoil"** of September 23, 1994 is aimed at ensuring the sustainable and comprehensive use of mineral resources to meet the needs in minerals and other needs, the protection of subsoil, the environment, security of subsoil use and protection of subsoil users, protection of the interests of citizens, society and the state. It regulates the issues of underground water and soil contamination
- **The Law on Environmental Expertise** (2001) (as amended on 14.09.2018) provides for mandatory examination of the impact on the environment and human health, and also serves as a legal basis for the examination
- **The Law on Environmental Control** (2013) regulates relations in the field of environmental protection. The main objectives of environmental control are prevention, detection and redress of violations of environmental legislation; monitoring of the environmental situation and factors that may lead to environmental pollution, irrational use of natural resources, threat to life and health of citizens;
- **The Law on the National Security Concept** (1997), provides the main structure for achieving environmental safety, etc.
- **The Law "On Protection of Agricultural Plants from Pests, Diseases and Weeds"** (2000) regulates relations connected with ensuring protection of agricultural plants from pests, diseases and weeds, prevention of harmful impact of plant protection means on human health and environment.

2.1.3 International Environmental Conventions and Agreements

In the context of the global environment, Uzbekistan is a party to following international conventions:

- Convention on Climate Change
- The Convention on Biological Diversity
- Convention to Combat Desertification

In addition, Uzbekistan has adopted a number of other international conventions, protocols, agreements and memoranda of understanding in the field of environmental protection and sustainable development. The following are global agreements in which Uzbekistan is involved:

- Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (05/26/1993);
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (12/22/1995);
- Convention concerning the Protection of the World Cultural and Natural Heritage (12/22/1995);
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (07/01/1997);
- Bonn Convention on the Conservation of Migratory Species of Wild Animals (05/01/1998);
- Ramsar Convention on Wetlands of International Importance, especially as Waterfowl Habitat (08/30/2001).

2.1.4 National Environmental Impact Assessment Process

All developments under the Project as well as the associated project are subject to national environmental impact assessment (**EIA**). The national EIA in Uzbekistan is governed by the following main legislation:

- RoU Law of 18.04.2018 No.754-XII "On Nature Protection"
- RoU Law No.73-II3 of 14.09.2017 "On Environmental Expertise" (**Law on Environmental Expertise**).
- Decree of the Cabinet of Ministers of the Republic of Uzbekistan of 22.11.2018 No.949 "On Approval of the "Regulation on State Environmental Expertise in the Republic of Uzbekistan" (**SEE Decree**)
- Decree of the Cabinet of Ministers of the Republic of Uzbekistan of 21.01.2014 No.DCM14 "On Approval of the "Regulation on the Procedure for development and approval of draft environmental standards".

The National EIA procedure involves state environmental expertise (**SEE**). Article 3 of the Law on Environmental Expertise (2000) sets forth key objectives of the EIA process, i.e. to identify:

- Compliance of a project with the existing environmental requirements to inform the decision-making process
- The level of environmental hazards associated with a project or any operations that may have or may have had a negative impact on the environment and public health
- Adequacy and feasibility of measures in protecting the environment and promoting sustainable use of natural resources.

The special authorized state body in the field of state environmental expertise is the State Committee on Ecology and Environmental Protection ("**Goskomekologiya**"). It is the national authority responsible for SEE reviews via the State Unitary Enterprise (**SUE**) "Centre for State Environmental Expertise" that carries out SEE reviews of high and medium risk projects or its regional bodies that review projects with low risk and local impact.

The SEE Degree stipulates four categories of development within the SEE context, ranging from Category 1 (High Risk) to Category 4 (Local Impact):

- Category I – high risk of environmental impact (SEE is conducted by the SUE "Centre of State Environmental Expertise" within 20 days, all stages of the EIA are required)
- Category II – medium risk of environmental impact (SEE is conducted by SUE "Centre of State Environmental Expertise" within 15 days, all stages of the EIA are required);
- Category III – low risk of environmental impact (SEE is conducted by the regional offices of the SUE "Centre of State Environmental Expertise" within 10 days, all stages of the EIA are required);

- Category IV – minor risk of environmental impact, local impact (SEE is conducted by regional offices of the SUE “Centre of State Environmental Expertise” within 5 days, only the first phase of the EIA process needs to be completed (Draft Statement on Environmental Impact).

All other projects that do not fall into these four different categories are considered as projects that do not have an impact on the environment and thus are not subject to SEE reviews and environmental permitting. The national EIA procedure does not set out a requirement to assess cumulative impacts.

Based on Annex 2 of the SEE Decree, the Project components are categorised as follows:

- (19) Irrigation channels with a capacity of less than 50 m^3/s – classified as Category 3 (low risk)
- (31) Ginning facilities – classified as Category 2 (medium risk)
- (43) Reclamation and improvement of irrigated land with the area of over 1,000 ha – falls into Category 3 (low risk)
- (9) Grain storage facilities / processing and preservation of agricultural products – classified as Category 4 project (local impact).

Pursuant to the SEE Decree, the national EIA is a staged process and involves four major phases: (i) Draft Statement on Environmental Impact (at the planning stage prior to financing), (ii) Statement on Environmental Impact (if additional surveys are recommended by the SEE), (iii) Statement on Environmental Consequences (during the commissioning phase), and (iv) Emission, Discharge and Waste Generation Permit (for the operational phase). Category 4 projects will need to complete Draft Statement on Environmental Impacts only. The first three stages are described below in more detail in the SEE review context.

Step 1: Draft Statement on Environmental Impact

A Draft Statement on Environmental Impact is prepared at the planning stage of a project prior to financing and shall include:

- Environmental conditions prior to the beginning of the planned activity, population of the territory, land development, analysis of environmental characteristics
- A situational plan indicating the existing recreational zones, settlements, irrigation, reclamation facilities, farmlands, power lines, transportation, water supply, gas pipelines and other information about the area;
- Proposed (planned) main and auxiliary facilities, machinery, technology, natural resources, materials, raw materials, fuel to be used and analysis of their environmental impacts and environmental hazards of the products;
- Expected emissions, discharges, wastes, their negative impact on the environment and methods of mitigation
- Wastes accumulation, storage and disposal
- Analysis of alternatives to planned or ongoing activities and technological solutions from the perspective of nature protection, taking into account the achievements of science, technology and best practices;
- Institutional, technical, technological solutions and measures that prevent negative environmental consequences and reduce adverse environmental impact of a project
- Analysis of emergency situations (with an assessment of their probability and scenarios to prevent their negative consequences)
- Forecast of changes in the environment and environmental consequences as a result of a project or operations

Step 2: Statement the Environmental Impact

The need for step 2 in the EIA process is identified during Step 1 by the SEE review resulting in a formal opinion as to whether additional surveys or studies are necessary. The Statement shall be submitted prior to approval of the Project Feasibility Study or construction. The Statement shall include:

- Assessment of environmental issues of the site based on the findings of respective engineering and geological surveys, modelling or any other studies that were recommended at Step 1
- Environmental analysis of the process/technology in relation to any issues identified for the site
- Results of public hearings (if necessary)
- Feasibility of environment protection measures to prevent negative consequences of a project or operations.

Step 3: Statement on Environmental Consequences

Statement on Environmental Consequences (**SEC**) is the final step in the SEE process and should be completed prior to commissioning. SEC is prepared for projects with significant adverse environmental and social impacts only. SEC shall include:

- Amended design solutions and other measures taken to address recommendations of the initial SEE review of the environmental impact as well as proposals received during consultations (public hearing events)
- Environmental standards regulating the activities of the object of expertise
- Requirements to operation and environmental monitoring at the operation phase
- Main conclusions on the project or proposed operations.

2.1.5 Land Acquisition Laws

In Uzbekistan, there is no separate legal document addressing land acquisition and resettlement. The Project needs to comply with the existing national laws and regulations that guide land acquisition, tenure and expropriation. The pieces of legislation listed in Table 2.2 will apply to the Project.

Table 2.2: National legal framework for land acquisition

Year	Law / Regulation	Recent amendment
08.12.1992	Constitution of the Republic of Uzbekistan	05.09.2019
30.04.1998	Land Code	14.11.2019
29.08.1996	Civil Code of Uzbekistan	18.04.2018
25.12.2007	Tax Code	11.10.2018
19.11.1991	Law on Lease No.427-XII	26.05.2000
30.04.1998	Law on Farms No.602-I	26.08.2004
30.10.2003	Decree of the RoU Cabinet of Ministers No.476 ""On Measures to Implement the Farms Development Concept for 2004-2006"	10.12.2018
29.05.2006	Decree of the RoU Cabinet of Ministers No.97 "On Compensation of Losses to Individuals and Legal Entities as a Result of Land Plots Expropriation for State and Public Needs".	29.05.2006
25.05.2011	Decree of the RoU Cabinet of Ministers No.146 "On Improvement of the Procedure for Provision of Land Plots, Protection of the Rights of Legal Entities and Individuals to Land Plots for Improvement of the Architectural Appearance of Residential Areas of the Republic, Optimal Use of their Lands for Development".	25.05.2011
31.01.2013	Decree of the RoU Cabinet of Ministers No.22 "On Approval of the Regulation on the Farm and Optimisation and Liquidation Procedure"	07.12.2018
25.01.2018	Decree of the RoU Cabinet of Ministers No.53 "On Measures to Introduce Modern Patterns for Cotton and Textile Production"	19.11.2019
16.06.2018	Decree of the RoU Cabinet of Ministers No.3857 "On Measures to Improve the Efficiency of the Preparation and Implementation of Projects Involving International Financial Institutions and Foreign Public Financial Organizations".	16.06.2018

Year	Law / Regulation	Recent amendment
01.08.2018	Presidential Decree No.5495 “On Measures to Radically Improve the Investment Climate in the Republic of Uzbekistan”	01.08.2018
08.08.2018	Decree of the RoU Cabinet of Ministers of Uzbekistan No.632 “On Measures to Establish the Modern Cotton-Textile Production by Indorama (Singapore) in Uzbekistan”	-
29.05.2006	Regulation on the Procedure for Compensation Payable to Citizens and Legal Entities in Connection with the Expropriation of Land for Public Purposes, approved by Decree of the Cabinet of Ministers of the Republic of Uzbekistan No.97	27.11.2018
19.09.2018	Decree of the RoU Cabinet of Ministers No.744 "On Additional Measures to Further Promote Cotton-Textile Production"	0511.2019
29.12.2018	Decree of the RoU Cabinet of Ministers No.1060 “On Measures to Improve State Registration Procedure for Immovable Property Rights”	02.07.19

Source: Mott MacDonald

Each of the above Laws and Regulations of Uzbekistan and the rights and obligations pertaining is described in more detail in the following bullets:

- **The Constitution of the Republic of Uzbekistan** of December 8, 1992 states that everyone shall have the right to own property (Article 36). The economy of Uzbekistan, evolving towards market relations, is based on various forms of ownership. The state shall guarantee freedom of economic activity, entrepreneurship and labour with due regard for the priority of consumers’ rights, as well as equality and legal protection of all forms of ownership (Article 53):
  - An owner shall possess, use and dispose of his property freely. The use of any property must not be harmful to the ecological environment, nor shall it infringe on the rights and legally protected interests of citizens, juridical entities or the state (Article 54);
  - The land, its minerals, fauna and flora, as well as other natural resources shall constitute the national wealth, and shall be rationally used and protected by the state (Article 55).
- **The Land Code** (1998) is the main legal framework for regulation of land-related aspects in Uzbekistan. The Land Code regulates the allocation, transfer, sale and expropriation of agricultural and urban land, determines ownership and rights to land. It describes the responsibilities of different state authorities in land management; rights and obligations of the land possessor, user, tenant, and owner; land category types; resolution of land disputes; and, land protection. According to the Land Code, all land in Uzbekistan is state property (Article 16) and permits for use of land are granted and monitored by the State through district and regional governments (hokimiyats). District and regional hokimiyats lease land to local legal entities and local farms and manage any land expropriation for state and public needs. The Cabinet of Ministers of the Republic of Uzbekistan decides on granting land lease to international companies and entities.

  In Uzbekistan, land expropriation is allowed for public needs under the Land Code. Expropriation in this context refers to the taking away of private land for a public purpose by the government with or without the owner’s consent subject to laws of eminent domain, which stipulates recompense via prompt and adequate compensation. Legal entities can have rights for land in the form of permanent tenure, permanent use, fixed-term (temporary) use, lease and ownership (Article 17):

  – **Permanent land tenure** is granted to enterprises, institutions and organizations for agriculture and forestry, as well as for other purposes if allowed by law (Article 20).
  – **Permanent or fixed-term land use** may be granted to non-agricultural entities, international companies/associations/organisations (Article 20).
  – **Land lease** is a fixed-term, chargeable tenure and use of the land under the terms of a Lease Agreement. The land is leased by hokims of districts and cities to legal entities in the Republic of Uzbekistan (Article 24, Article 1 of the Law on Lease).

- **Land ownership** results, by law, from privatization of trade and service facilities together with the land plot on which they are located (Article 18).

Agricultural land may be allocated to individual farmers to run a farm (treated as a legal entity) and companies involved in agricultural production (Article 46). Land allocated to a farm may not be subject to privatization, sale, donation or exchange. Land tenants or users need to pay for the land and are charged with annual land tax estimated on the basis of quality, location and availability of irrigation systems (Article 28). Leaseholders are paying a lease fee that equals to the land tax. The Land Code identifies that land tenants, leaseholders, users and owners, are eligible for compensation for losses and damages in connection with land acquisition or expropriation, including lost profit (Article 41).

- **The Civil Code** (1996) classifies land under proprietary rights. According to Article 165, proprietary rights, along with the right of ownership, also include the right of inherited lifetime possession of land and the right of permanent possession and use of land. Part I of the Civil Code establishes the general principles of civil law and regulates, *inter alia*, rights and obligations of legal entities, limitation of legal actions, proprietary rights and protection of property rights and other proprietary rights, transactions and contracts, security of commitments, etc. Part II of the Civil code regulates types of commitments, establishing the rights and obligations of the parties in various civil contracts. Most of the legal norms in the Civil Code are dispositive, i.e. can be changed at will by the parties of the transaction. A number of articles directly indicate this possibility and describe various options for legal arrangements.
- **Tax Code** (2007) regulates administration, calculation and payment of taxes, including of the land tax, and tax compliance.
- **Law on Lease** (1991) regulates lease arrangements related to chargeable possession and use of land, other natural resources as well as assets required to independently carry out economic and other operations by the tenant (Article 1). Land and other natural resources may be leased. Agricultural land may be leased only for agricultural production (Article 3).

  According to Article 13, any changes in the terms and conditions of the Land Lease Agreement and its termination are to be agreed by the parties. At the request of one of the parties, the LLA can be terminated by the decision of the court should the other party violate the terms and conditions of the LLA.
- **Law on Farms** (1998) regulates the process of establishment, operation, reorganisation and liquidation of farms. The law treats a farm as a business entity engaged in the farming of agricultural products using leased land.

  Farms may only lease land for agricultural production and other farming activities. The right to lease is granted on the basis of an open competition for a period of up to fifty years or minimum thirty years (Articles 1, 5 and 7).

  The Law on Farms states (Article 7) that a farm is considered to be established as soon as the state registration process is completed, and the farm founder (Farm Manager) has concluded a long-term LLA. A farm is entitled to open and maintain bank accounts and have a seal with the name of the farm. The Law on Farms stipulates rights (Article 16) *inter alia* to run a farming business, plant and harvest crops on the leased land in line with the farm statute and LLA provisions, enter into future contracts and request advance payments for farming products, sell products to consumers, set prices for farm products as well as works and services, award supply contracts (for instance for electricity, fuel and lubricants, mineral fertilizers, chemicals, water, technical and other services), generate and dispose of unlimited income (profit) from the farming business including money in the bank account, purchase shares and other securities, obtain loans, raise money and benefit from any privileges and preferences granted to small and private enterprises, and file legal actions to protect these rights and legitimate interests.

  The LLA is to be signed by Farm Manager and the District Hokim. and is subject to state registration in the Land Management and Real Estate Cadastre (Articles 3, 7, 11 and Clause 20 of the Regulation on the State Registration of Immovable Property Rights approved by **Decree of the RoU Cabinet of Ministers No.1060** of 29.12.2018).

The implementation of any agreement is, on the one hand, implementation of the terms and conditions, and, on the other hand, implementation of specific obligations and exercise of specific legal rights. The correlation of rights and obligations is unquestionable in the Land Lease Agreement, so that when the rights of the one of the parties are concerned, the corresponding obligations are also considered. In particular, the farm has the right to organize the production activities of the farm on the leased land in accordance with the specialization provided by the Charter and specified in the LLA (Article 16) and commits to ensure targeted, efficient and rational use of the land under conditions defined by law and the LLA (Article 17).

Should there be legal grounds, the land lease of the farm can be terminated. The grounds for termination can be divided into the following groups:

1. Initiative of the tenant (the farm) or landlord (hokimiyat)
2. Decision of the court
3. Liquidation of the farm
4. Expiry of lease
5. Expropriation of land for state needs (the end user (Project Owner) will be the state) and public needs (land is transferred (sold) to a private legal entity or individual).

When the land lease right is terminated, the Hokimiyats return their right to dispose of the land and can again grant it for lease or expose it as a subject to legal transactions. The farm, in turn, loses its rights to dispose of the land after the transaction ceases to be legally valid. The farm can restore the lost rights for land lease via court.

- **Decree of the RoU Cabinet of Ministers No.476** of 30.10.2003 approves the Programme for Implementation of the 2004-2006 Farms Development Concept and approves the Regulation on the Long-Term Lease of Land by Farmers (Appendix No.7). This Regulation sets out the procedure for allocating land to farmers based on long-term lease arrangements and provides a template of the Long-Term Land Lease Agreement (Appendix No.8).
- **Decree of the RoU Cabinet of Ministers No.97** of 29.05.2006. The Decree regulates the compensation of losses to individuals and legal entities resulted from expropriation of land plots for state and public needs. This regulation determines the procedure for land expropriation and sets out the procedure for calculating compensations for individuals and legal entities for the loss of residential, industrial and other buildings and structures in connection with the land expropriation.
- **Decree of the RoU Cabinet of Ministers No.146** of 25.05.2011. This Decree is aimed at improving the land allocation procedure for, ensuring the protection of the right of legal entities and individuals to land plots to improve the architectural appearance of residential areas in the country, the optimal use of their land for development in accordance with the Land Code and the Urban Development Code. The resolution approved two regulations: i) the Regulation on Land Allocation for Urban Development and Other Non-agricultural Purposes, and ii) Regulation on the Compensation Process for Landowners, Users, Tenants and Owners, including for losses in trees and crops.
- **Decree of the RoU Cabinet of Ministers No.22** of 31.01.2013 approves the Regulation on the Farm Land Optimisation and Liquidation Procedure. According to Clause 4 of the Regulation, the voluntary reduction of the size of the farm land is to be completed against a respective application of the Farm Manager to be submitted to the District (City) Hokim. If the farm wants to increase the size of the farm land, it should participate in the tender for long-term lease of state-owned land.

  The Regulation determines (Clause 9) that land optimisation is to be completed against a respective approval by the Regional Land Commission of the Hokim's Decree to modify the size of the farm land and introduction of respective amendments in the LLA signed between the District (City) Hokim and the Farm Manager.

- **Decree of the RoU Cabinet of Ministers No.53** of 25.01.2018 establishes cotton clusters across Uzbekistan and makes provisions for contract farming arrangements with the farms to supply raw cotton to the clusters.
- **Decree of the RoU Cabinet of Ministers No.3857** of 16.06.2018 partially provides for compensation for the acquisition of land, demolition of houses, other structures and assets, including crops, as part of projects. With the participation of international financial institutions (**IFIs**), and if agreed and specified in the Project agreements, land acquisition and compensation will be carried out by authorized bodies in accordance with the requirements of IFIs or foreign state financial organizations.
- **Presidential Decree No.5495 of 01.08.2018** partially provides that decisions on expropriation of land for state and public needs can be taken only after open discussion with stakeholders.
- **Decree of the RoU Cabinet of Ministers of Uzbekistan No.632** of 08.08.2018 authorises Regional and District Hokimiyats to transfer land to the private company for the purpose of socio-economic development and particularly makes provisions for allocating land to FE “Indorama Agro” LLC‘s cluster in two phases:

  I. Land in Kasbi, Nishon, Sardoba and Oqoltyn districts by the Hokimiyats of Kashkadarya and Syrdarya regions upon request of the Investor before November 1, 2018 as follows:

     - 40,000 ha of irrigated land to be allocated directly to the Company for direct farming of raw cotton and other crops
     - 10,000 ha of land to the local farms to supply raw cotton to the Company via contract farming arrangements

  II. Land for farming cotton and other crops in Ferghana and Jizzakh regions based on the Company’s performance during Phase I and the proposals of the Company reviewed by the Hokimiyats.

- **Decree of the RoU Cabinet of Ministers No.744** of 19.09.2018 further promotes implementation of the cotton clusters concept across the regions of Uzbekistan as previously established in Decree No.53. Decree No.744 establishes that the land returned by poorly performing farms is reallocated to the well-performing cotton clusters. The document recommends that (i) cotton clusters support local farms in introducing drip irrigation, (ii) commercial banks provide revolving lines of credit to finance introduction of drip irrigation and working capital of cotton clusters and (iii) the Prosecutor’s Office establishes stringent monitoring of contracts administration and the use of land by the clusters.

  According to Decree No.744, the RoU Ministry of Employment jointly with the Regional Hokimiyats shall help former employees of cotton facilities made redundant as a result of reallocation of facilities to cotton clusters in finding new jobs as well as issue/extend work permits to cotton clusters to attract in Uzbekistan highly qualified international human resources who specialise in agriculture against respective applications from the cotton clusters.

2.1.6 Labour and Working Conditions Laws

Republic of Uzbekistan ratified 16 ILO Conventions, including 8 fundamental conventions (refer to Sub-section 2.2.3) prohibiting child and forced labour and any forms of labour discrimination. These key labour standards are incorporated in the national labour legislation of Uzbekistan.

The following national laws and regulations will guide labour and working conditions aspects of the Project, including occupational health and safety issues:

- The Constitution of the Republic of Uzbekistan (1992). Specifically – Article 37 prohibits forced labour.
- Employment Act Law No.510-XII dated 13.01.1992
- Labour Code of the Republic of Uzbekistan (1995) – Article 7 clearly prohibits forced labour.
- RoU Law No.210 of 16.04.2009 “On Compulsory Insurance of Third-Party Liability of Employers”
- RoU Law No.410 of 22.09.2016 “On Occupational Health and Safety”
- RoU Law No.174 of 10.09.2008 “On Compulsory Industrial Accident and Occupational Disease Insurance”

- RoU Law No.938-XII of 03.09.1993 “On Public Pension Provisions”
- Decree No.5723 dated 21.05.2019 “On Improving the Procedure for Determining the Size of Wages, Pensions and Other Payments”
- Decree No.5291 dated 28.12.2017 “On Additional Measures to Create Favourable Conditions for Certain Categories of Pensioners Engaged in Labour Activities”
- GoU Resolution No.4235 dated 07.03.2019 “On Measures to Further Strengthen Guarantees for Labour Rights and Support of Women's Entrepreneurship”
- Decree of the Ministry of Employment and Labour and the Ministry of Health of the Republic of Uzbekistan No.22-14-02019k/k No.48 of 22.07.2019 “On Approval of the List of Hazardous Occupations for Women Not Recommended to be Used to Employ Women”
- GoU Resolution No.4008 dated 07.11.2018 “On Measures to Create Favourable Conditions for Labour Activity in the Republic of Uzbekistan for Qualified Foreign Specialists”
- GoU Resolution No.3839 dated 05.07.2018 “On Additional Measures to Improve the System of External Labour Migration in the Republic of Uzbekistan”
- GoU Resolution No.3439 dated 20.12.2017 “On Measures to Improve Cooperation with International and Foreign Financial Institutions”.

These laws consider the interests of workers, promote effective functioning of the labour market, safeguard fair and safe working conditions, protect labour rights and health of workers, contribute to the improvement of labour productivity, quality of work, welfare and social well-being of the population.

Specifically, starting from February 1, 2020, the minimum wage in Uzbekistan is UZS 679,330 per month. At the same time, the basic estimated value remains at the level UZS 223,000. People who have lost their job for the first time as well as those wishing to resume the work after a long-term break (more than one year) and recognised as unemployed, are provided with: payment of unemployment benefits (see Articles 65, 66 of the RoU Labour Code, Section IV (“Social Guarantees in Case of Loss of Work”) of the RoU Law “On employment”, Section VII (“Appointment and Payment of Unemployment Benefits”) of the Regulation on the Procedure for Registration of Citizens with Labour Authorities, Employment, Appointment and Payment of Unemployment Benefits (Regulation No.831 dated 10/13/1999).

Working hours is considered the time during which the employee must fulfil his labour duties in accordance with the schedule or work schedule or the terms of the employment contract. Overtime is considered work in excess of the employee’s daily work (shift) duration. Overtime work may be applied with the consent of the employee. With a work shift of twelve hours, as well as in work with particularly difficult and particularly harmful working conditions, overtime work is not allowed. Work in overtime, on weekends and holidays is paid no lower than double. The specific amount of payment is established in the collective agreement, and if it is not concluded, determined by the employer in consultation with the trade union committee or other representative body of workers. At the request of the employee, work on a holiday or day off can be compensated by providing another day of rest (time off). At the request of the employee, overtime work may also be offset by the provision of time off at a rate commensurate with the number of overtime hours worked. When compensating for work on a holiday or a day off or overtime for a day off, wages for such work are paid at least in a single amount.

Pregnant women and women who have given birth to a child shall be granted annual leave, if they wish, respectively, before or after maternity leave or after parental leave.

Single parents (widows, widowers, divorced, single mothers) and wives of military servicemen who bring up one or more children under the age of fourteen (disabled child under sixteen years of age), annual leave, if they wish, are provided in the summer or at another time convenient for them (Article 144).

Additionally, Administrative Code No.2015-XII of 22.09.1994 (Articles 51 and 491) and Criminal Code No.2012-XII of 22.09.1994 (Articles 135, 138, 148) establish penalties for the use of forced labour.

Since agricultural operations of the Project involve different types of machinery, including with sharp edges, tools, physical and biological hazards, various applicable national OHS requirements will be stated and discussed in detail in the Environmental and Social Management Plan.

2.1.7 Gender Context and Equal Opportunities

At present women's rights in Uzbekistan are guaranteed by:

- Constitution of the Republic of Uzbekistan, 1992
- Labour Code of the Republic of Uzbekistan (specifically Articles 225, 228, 229, 231, 232, 233, 236, 237, and other articles of Para 1 of Chapter 14), 1996
- Uzbekistan's Development Strategy for 2017-2021
- Family Code, 1998

Women's rights in Uzbekistan are also secured by international instruments ratified and signed by Uzbekistan, key of them are listed below:

- ILO Maternity Protection Convention (Revised) (1952), ratified by Uzbekistan in 1992

  Convention on the Elimination of All Forms of Discrimination against Women (1979), ratified by Uzbekistan in 1995
- Vienna Declaration on Human Rights (1993), and
- Beijing Declaration and Platform for Action (1995).

2.1.8 Community Health, Safety and Security Laws

The Law on Public Health of 29.08.1996 (as amended on 13.06.2017) regulates community health, safety and security. The main objectives of the law is ensuring the rights of citizens to health protection by the state; promotion of a healthy lifestyle; legal regulation of the activities of state bodies, enterprises, institutions, organisations and public associations in health care.

Norms for air quality and noise levels in residential areas are set forth in the following standards:

- SanPiN RUz No.0179-04 Hygiene standards. List of Maximum Permissible Concentrations (MPCs) of Pollutants in the Air of Residential Areas in the Republic of Uzbekistan, including Annex 1
- SanPiN RUz No.0267-09 Permissible noise level in the residential area, both inside and outside the buildings.

Pre-construction and construction activities are regulated by Sanitary Regulations No.0289-10.

Repairs and maintenance of residential buildings are regulated by Sanitary Rules and Regulations No.0329-16 for Maintenance and Refurbishment of Residential Buildings in the Republic of Uzbekistan

2.1.9 Cultural Heritage Laws

Law on Cultural Heritage of 18.04.2018 regulate cultural heritage issues in Uzbekistan. The law establishes procedures for the protection of cultural heritage and permitting for archaeological research. The purpose of this law is to regulate relations in protecting and use of cultural heritage objects that are the national heritage of the people of Uzbekistan.

2.2 Applicable International Requirements

The Project will seek compliance with the requirements of International Lenders as the Company intends to seek international financing for the Project (all jointly referred to as "**applicable international requirements**").

2.2.1 European Bank for Reconstruction and Development

EBRD applies a comprehensive set of social and environmental Performance Standards in its project review process. The current Environmental and social Policy and Performance Requirements came into force in January 2014.

The Project shall be structured to comply with the following Performance Requirements (**PRs**):

- EBRD PR-1: Assessment and Management of Environmental and Social Impacts and Issues
- EBRD PR-2: Labour and Working Conditions
- EBRD PR-3: Resource Efficiency and Pollution Prevention and Control
- EBRD PR-4: Health and Safety
- EBRD PR-5: Land Acquisition, Involuntary Resettlement and Economic Displacement
- EBRD PR-6: Biodiversity Conservation and Sustainable Management of Living Natural Resource
- EBRD PR-8: Cultural Heritage
- EBRD PR-10: Information Disclosure and Stakeholder Engagement

EBRD PR-5 Land Acquisition, Involuntary Resettlement and Economic Displacement does apply because a government decree was established which allowed the government to allocate land to the Project as a public need. Although many farmers willingly agreed to the terminate previous land lease agreements, the Decree allowed the Project to acquire land with the influence of the Government and allowed district hokimiyats to resort to expropriation through the legal system.

EBRD PR-7 “Indigenous Peoples” does not apply since there are no indigenous peoples affected by the Project.

EBRD PR-9 “Financial Intermediaries” does not apply either as the Company is not a financial intermediary.

2.2.2 International Financial Corporation

The IFC is a member of the World Bank Group and is recognised as an international leader in environmental and social sustainability policy. As a part of the ‘positive development outcomes’ outlined in the IFC’s Policy on Social and Environmental Sustainability, the Corporation applies a comprehensive set of social and environmental Performance Standards in its project review process. The current IFC Policy and Performance Standards on Social and Environmental Sustainability came into force in January 2012.

There are eight IFC Performance Standards:

- IFC PS1 – Assessment and Management of Environmental and Social Risks and Impacts
- IFC PS2 – Labour and Working Conditions
- IFC PS3 – Resource Efficiency and Pollution Prevention
- IFC PS4 – Community Health, Safety and Security
- IFC PS5 – Land Acquisition and Involuntary Resettlement
- IFC PS6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources
- IFC PS7 – Indigenous Peoples; and
- IFC PS8 – Cultural Heritage.

IFC PS5 – Land Acquisition and Involuntary Resettlement does apply because a government decree was established which allowed the government to allocate land to the Project as a public need. Although many farmers willingly agreed to the terminate previous land lease agreements, the Decree allowed the Project to acquire land with the influence of the Government and allowed district hokimiyats to resort to expropriation through the legal system.

IFC PS7 – Indigenous Peoples does not apply since there are no indigenous peoples affected by the Project.

PS3 references the IFC's EHS Guidelines; these are technical reference documents with general and industry-specific examples of Good International Industry Practice. The following EHS Guidelines are relevant to the Project:

- Environmental, Health and Safety Guidelines. General Guidelines (2007)
- Environmental, Health, and Safety Guidelines for Annual Crop Production (2016).

Where host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever standards are more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment.

2.2.3 International Labour Organization

Uzbekistan ratified the following eight fundamental conventions of the International Labour Organization:

1. Forced Labour Convention, 1930 (No.29), ratified by Uzbekistan in 1992 and Protocol of 2014 to the Forced Labour Convention (1930), ratified by Uzbekistan in 2019
2. Freedom of Association and Protection of the Right to Organise Convention, 1948 (No.87), ratified by Uzbekistan in 2016
3. Right to Organise and Collective Bargaining Convention, 1949 (No.98), ratified by Uzbekistan in 1992
4. Equal Remuneration Convention, 1951 (No.100), ratified by Uzbekistan in 1992
5. Abolition of Forced Labour Convention, 1957 (No.105), ratified by Uzbekistan in 1997
6. Discrimination (Employment and Occupation) Convention, 1958 (No.111), ratified by Uzbekistan in 1992
7. Minimum Age Convention, 1973 (No.138), ratified by Uzbekistan in 2009
8. Worst Forms of Child Labour Convention, 1999 (No.182), ratified by Uzbekistan in 2008

The other applicable ratified conventions of the International Labour Organisation are:

- Forty-Hour Week Convention, 1935 (No.47), ratified by Uzbekistan in 1992
- Holidays with Pay Convention, 1936 (No.52), ratified by Uzbekistan in 1992
- Maternity Protection Convention (revised 1952) (No.103), ratified by Uzbekistan in 1992
- Employment Policy Convention, 1964 (No.122), ratified by Uzbekistan in 1992
- Workers' Representatives Convention, 1971 (No.135), ratified by Uzbekistan in 1997
- Collective Bargaining Convention, 1981 (No.154), ratified by Uzbekistan in 1997
- Labour Inspection (Agriculture) Governance Convention 1962 (No.129), ratified by Uzbekistan in 2019
- Tripartite Consultation (International Labour Standards) Convention 1976 (No.144), ratified by Uzbekistan in 2019 (not yet in force).

Uzbekistan acknowledges the issue of child and forced labour[10] in the country and is now implementing the Decent Work Country Programme that has been established as the main vehicle for delivery of ILO support to the country in implementing ILO standards.

2.2.4 EU Directives and Standards

The following European Union (**EU**) Directives will apply to the Project:

- SEA Directive 2001/42/EC

[10] Decree of the Cabinet of Ministers No.349 of 10.05.2018 No.349 "On Additional Measures to Eradicate Forced Labour in Uzbekistan"

- EIA Directive 2014/52/EU
- Birds Directive 2009/147/EC
- Habitats Directive 92/43/EEC
- Water Framework Directive 2000/60/EC
- Groundwater Directive 2006/118/EC
- Sustainable Use of Pesticides Directive 2009/128/EC
- EU Waste Framework Directive (2006/12/EC)
- EU Directive Indicative Occupational Exposure Limit Values (2017/164/EU).

2.2.5 Best Available Techniques

Integrated Pollution Prevention and Control (**IPPC**) Reference Document on Best Available Techniques for the Textiles Industry (2003).

3 Assessment Scope and Methodology

3.1 Approach

The aim of the Environmental & Social Impact Assessment is to identify the potential environmental and social impacts of the Project and to define mitigation and management measures to avoid, reduce or remediate potential adverse E&S impacts. To meet international standards the general approach to the Project impact assessment has been developed based on best international ESIA practice and include the following key steps:

- **Define the Project and consider alternatives**: Define the proposed Project activities, including preparation, development/construction works and operation practices which are likely to affect the surrounding environment, farmers and communities along with considering the alternatives
- **Scoping**: Define the scope of the E&S assessment based on the issues which may cause significant effects on the receiving environment, communities and individuals based on the opinion of stakeholders and findings of the Scoping Phase
- **Baseline Conditions:** Define the existing baseline E&S conditions of the Project area and potential Project AoI. The baseline seeks to identify the E&S receptors and resources within the study area to understand and determine the value (or sensitivity) of these receptors and resources
- **Study Area(s)**: Establish the study areas / area(s) of influence, including both the spatial and temporal boundaries
- **Identify potential E&S impacts of the Project**: Define (for relevant aspects) the value (or sensitivity) of the receptors and resources likely to be impacted. Identify the potential E&S impacts (including cumulative and synergistic impacts). Determine the magnitude of potential impacts (i.e. change) from the Project on the environmental and social baseline conditions (including the receptors and resources). Determine the likely significance of the effect of these impacts before mitigation measures are applied (i.e. Significance of Effects (without mitigation))
- **Detail appropriate mitigation**: Detail appropriate mitigation measures to address predicted negative effects and enhancement measures to maximise anticipated benefits of the Project
- **Assess the residual effects of the Project and determine the level of significance**: Determine significance of residual effects (including any residual cumulative and synergistic) after consideration of the effectiveness of the design and committed mitigation measures. This stage of the impact assessment determines the likely significance of any residual effects following the application of mitigation measures (i.e. Significance of Effects (with mitigation)) by considering the Significance of Effects (without mitigation) along with the probable success of mitigation measures
- **Plan environmental and social management and monitoring arrangements**, including stakeholder engagement.

In line with the applicable international requirements for impact assessment, the scope of the ESIA study includes:

- Environmental, social, human rights, labour, gender, health, safety and security risks and impacts
- The Project and related facilities
- Risks and impacts that may arise for each key stage of the Project cycle: including pre-construction, development/construction, operation and decommissioning or closure
- Identification of Project stakeholders, including vulnerable stakeholders who may be disproportionately impacted

- Role and capacity of the relevant parties including the Project Sponsor, government, farmers, contractors and suppliers
- Potential third-party impacts including supply chain considerations.

Based on the assessment approach, the ESIA has identified the nature of impacts (negative or positive), their types (direct and indirect) and magnitude, impact likelihood, reversibility, duration and extent of impacts related to the bio-physical and socio-economic environment as well as cumulative impacts resulting from any other activities and operations in the Project area.

The definition of the Project includes all infrastructure and facilities that are directly part of the proposed development. An associated development of 5 km Power Transmission Line in Syrdarya region that exist specifically for the Project has also been identified and assessed.

3.2 Scoping Assessment

For the first step in the ESIA process, in July-August 2019 the Consultant undertook a Scoping Study aiming at:

- Reconnaissance with the Project
- Reviewing and determining the Project E&S compliance
- Reviewing the existing Project documentation and studies against the applicable national and international compliance requirements
- Identification of gaps in the baseline to inform the ESIA study to meet international standards
- Determining key issues related to the Project that will be addressed in the ESIA study
- Identification of key Project stakeholders, interested and affected parties and undertaking scoping consultations with them
- Planning stakeholder engagement and disclosure for the Project life cycle, including during the ESIA phase of the Project.

The scoping site visit took place between 14-20 July 2019. Five members of the Consultant's team travelled to the Kashkadarya and Syrdarya regions, inspected the Project sites and the area, consulted with local governments, authorities and communities' and farmers' representatives and local Women Affairs Committees in communities (Chapter 4) in the Project area and discussed the Project with the Company and Sponsor.

Scoping Surveys

The Scoping Study carried out water and soil sampling and testing across the Project sites to identify the current status of water and soils in the Project area and inform the environmental impact assessment. Results of all water and soil tests completed during the Scoping and Impact Assessment Phases of this ESIA are included in Volume III ("Appendices and Supporting Documents") of the ESIA Report.

The Consultant produced a Scoping Report (August 2019) that summarises the ESIA programme, studies and sets out the potential E&S issues associated with the Project and establishes the scope and methodology of studying potentially significant environmental and social impacts of the Project.

3.3 Potential Impacts

Based on the scoping process, the assessment of impacts in the ESIA has focused on the following issues:

- Child and forced labour
- Freedom of association
- Community health, safety, security and well-being
- Occupational health and safety

- Socio-economic impacts, especially on women
- Vulnerable groups
- Disturbance
- Influx of workers and population changes
- Land acquisition and economic displacement, including previously completed land allocation
- Air quality
- Noise and vibration
- Hydrology
- Hydrogeology / land contamination
- Ecology
- Waste
- Traffic and transport
- Cultural heritage

Detailed consideration of all potential social and environmental impacts of the Project is reported in the subsequent assessment sections in Chapters 5 and 6 respectively. Impacts associated with the decommissioning of the Project facilities are discussed and assessed under respective environmental and social topics.

Surveys of the Impact Assessment Phase

The ESIA phase surveys were undertaken during a number of site visits to the Project area in August and September 2019 to inform the impact assessment process in line with the findings of the Scoping Report. These included:

- Irrigation water sampling and testing (mineralization, nitrates, nitrites, nitrogen, sulphates, ammonia, heavy metals) – completed in August 2019
- Drainage water sampling and testing (mineralization, nitrates, nitrites, nitrogen, sulphates, ammonia, heavy metals) – completed in August 2019
- Drainage water sampling and testing (pesticides) – completed in September 2019
- Soil sampling and testing (total humus, total phosphorus, total nitrogen, total potassium, nitrates, nitrites, phosphates, ammonia, oil) – completed in August 2019
- Botanical survey across Project territory (plant communities, endangered and alien species) – completed in August 2019
- Birdlife surveys across the Project area and along the PTL route (associated project) – completed between13 and 22 September 2019
- Transport survey – completed in August 2019.

Results of all water and soil tests completed at the Impact Assessment Phase are included in Volume III (“Appendices and Supporting Documents”) of the ESIA Report.

The ESIA assessment phase has also obtained historical climate data (for a period of 30 years) and climate forecasts (for the period of 50 years) to inform the climate risk assessment study of the ESIA. The Climate Risk Assessment Report is included in Volume III (“Appendices and Supporting Documents”) of the ESIA Report.

3.4 Impact Assessment Methodology

Following scoping and identification of likely environmental and social effects, specialist assessments have been carried out in order to predict potential impacts associated with the Project and propose measures to mitigate the effects as appropriate.

3.4.1 Baseline

Initially, the baseline information used for the ESIA has been established using the following sources of environmental and social information:

- Desk top studies of the Project area
- Feasibility studies undertaken by the Project to date
- Site visits to the Project area and interviews
- Analysis of water and soil samples conducted by the modern certified water and soil laboratory of the State Enterprise “Uzbekhydroheologia”
- Analysis of water samples on pesticides conducted by the Testing Centre of the Certification Authority for Fertilizers, Pesticides and Chemical Protection of Plants of the Scientific Institute of the Plant Communities of the Academy of Science of the Republic of Uzbekistan, leading laboratory in the agricultural soil chemistry in the Central Asia region
- Findings of the botanical survey
- Findings of the birdlife surveys
- Findings of the transportation survey
- Climate data provided by the Centre of Hydrometeorological Service under the Ministry of Emergency Situations of the Republic of Uzbekistan (**UzHydromet**)
- National statistics data
- Data provided by local authorities and regulators
- Data provided by mahallas
- Publicly available information
- Consultation with the Project stakeholders.

Relevant baseline information used to support the assessment process is referenced / summarised in the relevant impact assessment sections in Chapter 6.

3.4.2 Spatial Scope

The spatial extent of the study area is described by the geographical boundaries of the Project land and sites. The definition of the spatial scope has taken account of:

- Nature of the existing baseline environment
- Manner of impact (e.g. effects on air quality may extend over some distance)
- Area affected by impacts (positively and negatively)
- Locations of affected communities (positively and negatively)
- Geographical boundaries of the political and administrative authorities, and
- Surrounding area where indirect and cumulative effects are likely to occur during the Project lifetime.

The effects for each of the disciplines are likely to be confined to different spatial extents. Where sensitive receptors and resources are located beyond the immediate Project area, these have been considered under respective environmental and social topics. The results of the stakeholder consultation (Chapter 4) have been considered when determining the relevant spatial study area for specific E&S aspects.

3.4.3 Temporal Scope

The ESIA addressed both positive and negative effects arising from the development/construction, operation and decommissioning of the Project as follows:

- **Development/construction effects** that arise directly from land preparation and construction activities (e.g. piling) but also from the temporary use of land (e.g. construction sites and lay down areas) or from associated changes in traffic movements (e.g. diversions in and around the Project area)
- **Operational effects** that arise from Project facilities operation (including associated facilities), and
- **Effects associated with decommissioning of Project facilities** have been considered (e.g. recycling and/or disposal of Project infrastructure, loss of employment).

The significance of the effects (both positive and negative) that will arise in each of these phases is based on any changes compared to the baseline conditions (i.e. those conditions which would exist if the proposals did not go ahead).

Development/construction effects have been assessed throughout the duration of the land preparation and construction period for the Project and associated PTL project.

3.4.4 Area of Influence

The AoI indicates where proposed works or operations, including related facilities and infrastructure will have a direct or indirect impact on the physical and social environment. This can result from aspects such as the physical land-take or as a result of the potential impact that extends beyond the Project physical boundaries such as noise. The AoI can also vary according to the stage of the Project that is being assessed such that construction impacts may have a greater area of impact than for operation. For each impact assessment topic, the spatial and temporal zones of influence are defined.

3.4.5 Assessment of Impacts

4.6.1 Overview

The impact identification and assessment process considered: (i) baseline conditions and sensitivity (value) of resources/receptors, and (ii) the Project activities as a source of impacts. The assessment of the significance of effects and identification of residual impacts has taken account of any incorporated mitigation measures adopted by the Project and is largely dependent on the extent and duration of change, the number of people or size of the resource affected and their sensitivity to the change. The criteria for determining significance is specific for each environmental and social aspect but generally for each impact the magnitude is defined (quantitatively where possible) and the sensitivity of the receptor is defined. Generic criteria for defining magnitude and sensitivity are summarised below.

3.4.6 Magnitude

The assessment of magnitude has been undertaken in two steps. Firstly, the key issues associated with the Project have been categorised as beneficial or adverse. Secondly, the magnitude of potential impacts has been categorised as **major, moderate, minor** or **negligible** based on consideration of the parameters such as:

- Type of impact: direct/indirect/cumulative
- Duration of impact: ranging from beyond decommissioning to temporary with no detectable impact
- Spatial extent of impact: within the site (local) and boundary to regional, national or transboundary
- Reversibility: ranging from permanent requiring significant intervention to return to baseline to no change
- Likelihood: ranging from occurring regularly under typical conditions to unlikely to occur

- Compliance with legal standards and established professional criteria: ranging from substantially exceeds national standards and limits / lenders guidance to meets or exceeds minimum standards or lenders guidance
- Number of people or groups affected: from individual to nation-wide
- Benefit sharing: from local to transboundary.

Table 3.1 below outlines the criteria for determining magnitude for this assessment.

Table 3.1: General criteria for determining impact magnitude

Magnitude (beneficial or adverse)	Description
Major	Fundamental change to the specific conditions assessed resulting in long-term or permanent change, typically widespread in natural or social environment, and requiring significant intervention to return to baseline; exceeds national standards and limits
Moderate	Detectable change to the specific natural and social environment conditions assessed resulting in non-fundamental temporary or permanent change
Minor	Detectable but minor change to the specific natural and social environment condition assessed
Negligible	No perceptible change to the specific natural and social environment condition assessed

Source: Mott MacDonald

Typical criteria for determining sensitivity of receptors are summarised below.

3.4.7 Sensitivity of Receptors

Sensitivity is generally site specific and criteria have been developed from the baseline information gathered. The sensitivity of a receptor will be determined based on review of the population (including proximity / numbers / vulnerability) and presence of features on the site or the surrounding area. Generic criteria for determining sensitivity of receptors are outlined in Table 3.2. The assessment will define sensitivity in relation to their topic.

Table 3.2: General criteria for determining sensitivity (positive or negative)

Magnitude (positive or negative)	Definition (type and duration of the impact, spatial extent, reversibility and ability of comply with legislation)
High	Vulnerable receptor (human or terrestrial) with little or no capacity to absorb proposed changes or minimal opportunities for mitigation (or with very little or no access to alternative similar sites or services)
Medium	Vulnerable receptor (human or terrestrial) with limited capacity to absorb proposed changes or limited opportunities for mitigation (or with little access to alternative similar sites or services)
Low	Non-vulnerable receptor (human or terrestrial) with some capacity to absorb proposed changes or moderate opportunities for mitigation (or with some access to alternative similar sites or services)
Negligible	Non-vulnerable receptor (human or terrestrial) with good capacity to absorb proposed changes or and good opportunities for mitigation (or with good access to alternative similar sites or services)

Source: Mott MacDonald

3.4.8 Impact Evaluation and Determination of Significance

Likely impacts have been evaluated taking into account the interaction between the magnitude of impact and resource/receptor sensitivity criteria as presented in the impact significance matrix in Figure 3.1 below. Four significance categories (**major, moderate, minor** and **negligible**) have been used to assess each environmental and social impact.

For each E&S aspect, the significance of impacts has been discussed before and after mitigation (i.e. residual impact). Impacts that have been evaluated as being ‘moderate’ or ‘major’ are significant effects and will be

identified as such in the specialist assessment sections in Chapter 6. Impacts that are 'minor' or 'negligible' are not significant.

Where feasible the following hierarchy of mitigation measures will be applied to significant impacts to reduce, where possible, the significance of impacts to acceptable levels:

- Mitigation / elimination through design
- Site / technology choice
- Application of best practice.

Figure 3.1: Impact Significance Matrix

Sensitivity	Magnitude						
	Adverse				Beneficial		
	Major	Moderate	Minor	Negligible	Minor	Moderate	Major
High	Major	Major	Moderate	Negligible	Moderate	Major	Major
Medium	Major	Moderate	Minor	Negligible	Minor	Moderate	Major
Low	Moderate	Minor	Negligible	Negligible	Negligible	Minor	Moderate
Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

Source: Mott MacDonald

For non-significant effects mitigation and good practice measures has been recommended where appropriate.

Uncertainty

Any uncertainties associated with impact prediction or the sensitivity of receptors due to the absence of data or other limitation have been explicitly stated. Where applicable, the ESIA makes commitments concerning measures that should be put in place with monitoring and / or environmental or social management plans to deal with the uncertainty. This is summarised in the Project ESMP.

3.4.9 Assessment of Cumulative Impacts

Cumulative impacts are those effects that may result from the combination of past, present or future actions of existing or planned activities in a project's area of influence. While a single activity may itself result in an insignificant impact, it may, when combined with other impacts (significant or insignificant) in the same geographical area and occurring at the same time, result in a cumulative impact that is significant.

The assessments within this ESIA have included, where relevant, an assessment of the cumulative impact of the Project with other present developments in the AoI.

The ESIA takes account of the existing agricultural area within assessment of each E&S discipline through characterisation of the existing baseline conditions (Chapter 6). Potential cumulative environmental effects of the Project will be associated with the overall reduction in water consumption for irrigation and reduction of soil impacts through more efficient use of chemicals and pesticides in the Project area.

3.4.10 Proposals for Monitoring

Where appropriate, proposals for future monitoring have been put forward within the assessment Sections in Chapter 7. These proposals for monitoring have been designed to evaluate the accuracy of the impact prediction and the success of the implemented mitigation measures. All future monitoring has been committed within the ESMP.

4 Information Disclosure, Consultation and Participation

4.1 Overview

This Chapter outlines the information disclosure, consultation and participation activities that have been undertaken as part of the ESIA process. It further summarises the outcomes of these activities, and defines those actions planned for future phases in the Project lifecycle, as detailed in the Stakeholder Engagement Plan, which can be found at the web-sites of District Hokimiyats in Kasbi, Nishon, Sardoba and Oqoltyn districts (www.indorama-agro.com).

This Chapter discusses:

- Principles of consultation
- Consultation requirements
- Core stakeholders and consultees
- Project consultation activities and their outcomes
- Project grievance redress mechanism.

4.2 Principles of Consultation

Early and ongoing consultation, disclosure and meaningful stakeholder engagement are key requirements for projects financed by the International Lenders. The ESIA is informed by the outcomes of consultation activities included in the SEP that is produced to guide the stakeholder engagement and disclosure process for the lifecycle of the Project.

The Project SEP has been designed to guide public consultation and disclosure activities up to the completion of the ESIA Report and through the development/construction and operation phases of the Project. It is a strategic document for planning meaningful and appropriate consultation with the key stakeholders and will be updated periodically as the Project progresses. Stakeholders are defined as persons and entities who are interested in, are affected by, or can affect the outcome of the Project. Specific objectives of the SEP are to provide a consultation strategy for the Project to:

- Ensure all legal and international requirements related to consultation are addressed
- Involve the full range of stakeholders in the planning of the Project to improve the Project design, implementation and monitoring
- Encourage an open dialogue with the affected communities (ACs) where the Project is located
- Keep all interested and affected stakeholders informed of Project progress
- Provide a grievance mechanism for the ACs to raise complaints and ensure that they are appropriately addressed by the Project.

The SEP is underpinned by the principles that community engagement should be free of external manipulation, interference, coercion and intimidation and conducted on the basis of timely, relevant, understandable and accessible information. Consultation activities should always be well planned and based on principles of respectful and meaningful dialogue.

4.3 Consultation Requirements

4.3.1 Overview

This Section provides an overview of the national and international disclosure, consultation and stakeholder engagement requirements applied to the Project. It is anticipated that financing for the Project will be sought from International Lenders meaning that the Project will need to be structured to meet the EBRD Environmental and Social Policy (2014) and Performance Requirements and IFC Performance Standards on Environmental and Social Sustainability (2012). These requirements have been considered in planning stakeholder engagement and have guided the consultation process of the Project as described below.

4.3.2 National Consultation Requirements

Several developments under the Project as well as the associated project are subject to national EIA as discussed in Chapter 2.

The national EIA process[11] specifies two non-mandatory mechanisms for consultation during the EIA process: the public environmental review (**PER**) and public hearings. PER might be undertaken by an independent expert panel and the opinion granted by PER will not have mandatory implications.

There is no official regulatory guidance as to which type of project requires a public hearing or how public hearings should be conducted. The EIA Procedure Manual provides some guidance. It recommends that public hearings be held when the draft EIA Report is ready and suggests how organise such events and who potential attendees might be.

The Law on Environmental Expertise (2017)[12] states, that a project promoter could announce locally that the EIA procedure is underway. In this case, after completion of the EIA process, the EIA findings should be made public within one-month period. However, there is no specific legislation that guides the disclosure procedure. The national guidance specifies that results of public hearings and disclosure should be included in the EIA documentation to be submitted for SEE review. The Statement on Environmental Consequences (Step 3 in the EIA process) shall detail *inter alia* all comments received through the public hearings, if undertaken.

Since the existing approach to public consultation in Uzbekistan does not involve extensive engagement of the general public and is sometimes limited to consultation with local authorities, rather than the general public, the approach to planning engagement and disclosure for the Project has been guided by GIP embodied in the applicable international requirements as summarised below.

4.3.3 International Consultation Requirements

EBRD Requirements

EBRD is committed to promoting environmentally sound and sustainable development in line with:

- EBRD ESP (2014) and *PR10: Information Disclosure and Stakeholder Engagement*
- Public Information Policy (2014)

The EBRD's ESP defines stakeholder engagement as an on-going process which involves the following elements: (i) stakeholder identification and analysis; (ii) stakeholder engagement planning; (iii) disclosure of information; (iv) meaningful consultation and participation; (v) an effective grievance procedure or mechanism, and (vi) ongoing reporting to relevant stakeholders. The process of stakeholder engagement should begin at the earliest stage of project planning and continue throughout the project life.

[11] The Regulation on State Environmental Expertise in the Republic of Uzbekistan approved by Decree of the Cabinet of Ministers of the Republic of Uzbekistan of 22.11.2018 No.949.

[12] Law of the Republic of Uzbekistan No.73-II3 of 14.09,2017 "On Environmental Expertise".

For this Project EBRD requires that the Company will:

- Build disclosure and consultation requirements into each stage of the ESIA process
- Identify and document the various individuals or groups who are or will be directly or indirectly affected by the Project, including any vulnerable individuals or groups, and those who may have an interest in it
- Define clear roles, responsibilities and authority as well as designate specific personnel to be responsible for stakeholder engagement activities including implementation and monitoring
- Engage in a scoping process with interested parties and make sure that stakeholders are able to provide comments and recommendations on the draft SEP and other scoping documents.
- Develop and implement a Stakeholder Engagement Plan
- Disclose the Environmental and Social Action Plan and other relevant documents prepared as part of the ESIA study in accordance with the SEP
- Keep the ESIA in the public domain throughout the life of the Project which may be amended from time to time, with additional information
- Provide annual reports to the Project stakeholders on E&S performance (as publication or via a website) throughout the life of a project. These reports will be in a format accessible to the affected communities
- Disclose additional information at key stages in the project cycle (prior to construction start, start-up of operations, decommissioning)
- Inform the ACs if there are material changes to the Project which result in additional adverse impacts or issues of concern and report how these impacts and issues are being addressed including disclosure of the Environmental and Social Management Plan in accordance with the SEP
- Carry out additional disclosure and consultation if additional adverse impacts on the ACs are significant
- Respond to stakeholders' concerns related to the Project in a timely manner
- Establish an effective grievance mechanism to receive and facilitate resolution of stakeholders' concerns and grievances

Special provisions shall be made to allow disadvantaged or vulnerable groups or individuals to be informed about the Project and give their views on the Project where appropriate.[13]

IFC Requirements

IFC's PS1 on Assessment and Management of Environmental and Social Risks and Impacts includes the relevant disclosure and stakeholder consultation requirements which include the following:

- Start as early as possible in the project cycle;
- Continue throughout the life of the project;
- Be free of external manipulation, interference, coercion, or intimidation;
- Where applicable enable meaningful community participation; and
- Conduct consultation on the basis of timely, relevant, understandable, and accessible information in a culturally appropriate format.

IFC's Access to Information Policy states that for Category A projects proposed for financing, a summary of review findings and recommendations must be disclosed and include as a minimum the following information:

- Reference to the Performance Standards and any applicable grievance mechanisms, including the compliance advisor/ombudsman

[13] As defined in the EBRD's ESP vulnerable groups refer to people who, by virtue of gender identity, sexual orientation, religion, ethnicity, indigenous status, age, disability, economic disadvantage or social status may be more adversely affected by project impacts than others and who may be limited in their ability to claim or take advantage of project benefits. Vulnerable individuals and/or groups may also include, but not be limited to, people living below the poverty line, the landless, the elderly, women and children headed households, refugees, internally displaced people, ethnic minorities, natural resource dependent communities or other displaced persons who may not be protected through national legislation and /or international law.

- The rationale for IFC's categorisation of the project
- A description of the main social and environmental risks and impacts of the project
- Key measures identified to mitigate those risks and impacts, specifying any supplemental measures and actions that will need to be implemented to undertake the project in a manner consistent with the Performance Standards
- Electronic copies or weblinks to any relevant ESIA Report prepared by the developer
- Any additional documents such as Action Plans, Stakeholder Engagement Plans, Resettlement Action Plans, etc.

4.4 Stakeholder Identification

The Project identifies the stakeholders who are persons or groups who are directly or indirectly affected by the Project, as well as those who may have interests in the Project and/or the ability to influence its outcome, either positively or negatively. Stakeholders for the Project include locally affected communities and their formal and informal representatives, the Company's employees and contracted farmers, national, regional and local governments and authorities, civil society organisations and groups with special interests, the academic community, or businesses.

At this phase, the Project has identified nine groups of key stakeholders. An analysis of key Project stakeholders, their interests, and suggested communication and consultation method for each group is summarised in Table 4.1 below.

Table 4.1: Project stakeholders and consultation methods

Stakeholders Identified	Status				Engagement Methods														
	Affected	Interested	Decision-makers/regulators	Face-to-face meeting	Formal communications	ESIA Disclosure Package	Public Exhibition Event	Disclosure of the Project leaflet	Disclosure of the Project HR Policy	Engagement with PU Managers	Engagement with the Project CLO	Engagement with EHS Officer(s)	Engagement with HR Manager	Community grievance mechanism	Workers' grievance mechanism	Monitoring missions	Progress and monitoring reports	Project web-site
(I) Project affected communities, vulnerable and marginalised groups																		x
• Residents of Kasbi and Nishon districts in Kashkadarya and Oqoltyn and Sardoba District in Syrdarya regions, including vulnerable and disadvantaged groups:	x					x	x	x	x		x			x				x
– disabled	x					x	x	x			x			x				x
– elderly	x					x	x	x			x			x				
– the poor	x						x	x			x			x				x
– unemployed	x					x	x	x	x		x			x				x
– women and female-headed households	x					x	x	x			x			x				x
– children under 16 years old	x						x	x			x			x				x
(II) Employees, job seekers and non-employee workers and their representatives																		
• Contracted farmers (394)	x					x	x		x	x	x	x	x		x			x
• Employees of FE "Indorama Agro" LLC	x					x	x		x				x		x			
• Construction workers (tbc)	x								x			x	x		x		x	
• Trade Unions and employee representatives		x		x	x	x	x		x		x	x	x		x			x
(III) International Lenders																		
• EBRD			x	x	x	x	x				x					x	x	x

• IFC and associated consultants		x	x	x	x	x				x					x	x	x
(IV) International Organisations																	
• International Labour Organization	x				x										x	x	
• International Cotton Advisory Committee	x			x	x							x			x	x	x
• Better Cotton Initiative	x			x	x							x			x	x	x
(V) National, Regional and Local Governments and Authorities																	
• Ministry of Agriculture		x	x	x	x	x			x	x							
• Ministry of Employment and Labour relations		x	x	x	x	x			x	x							
• Oblast Hokimiats (2)		x	x	x	x	x				x						x	
• District Hokimiats (4)		x	x	x	x	x				x						x	
• Coordination councils of citizens self-governance (mahallas)	x		x	x	x	x	x			x						x	
• Local environmental authorities	x		x	x	x	x				x	x						x
• Local labour and employment authorities	x		x	x	x	x				x							x
(VI) Sector organisations																	
• «Uztextileprom» Association	x			x	x				x								x
• «Uzpakhtasanoat» JSC	x			x	x												x
(VII) Civil society and non-governmental organisations (NGOs)																	
• Farmers Association	x			x	x	x				x					x		x
• Uzbek-German Forum for Human Rights																	
• Anti-Slavery International																	
• International Labor Rights Forum																	
• Uzbekistan's Women Committee																	
• Others (to be identified through SEP disclosure)																	
(VIII) Suppliers, Contractors and Private Businesses																	
• Local supplier	x			x	x			x		x	x	x				x	x
• Local contractors	x			x	x			x		x	x	x		x		x	x
• Other businesses (to be identified through SEP disclosure)	x				x												x
(IX) Other stakeholders																	
• Local public newspapers, local radio, local TV channels	x			x	x	x				x							x

4.5 Project Consultation Activities and Outcomes

4.5.1 Overview

This Section describes the activities undertaken during the ESIA process and their outcomes, and summarises those activities planned throughout the remainder of the Project's lifecycle in accordance with the SEP and the requirements outlined in Section 4.3.

4.5.2 Local Community Representatives

The Project will cooperate with community self-government units in the Project area – mahallas. Mahallas are chaired by elected "aqsaqals" of citizens' assemblies and supported by advisers and consultants (advisers on elderly and veteran, youth and women affairs, adviser on religious education, community safety, sports, etc.).

In order to reach those members of the communities adjacent to the Project who do not have access to the Internet, such as the elderly or poor households, the Company will liaise with mahallas to request their assistance and cooperation in stakeholder engagement activities. The mahallas in the Project AoI will hold hard copies of the Project documentation (Project leaflet, SEP and Non-Technical Summary (**NTS**)) and later the full draft and final ESIAs in Uzbek language and / or make them available in local public buildings so that when announcements are made in the media local people can easily access further information. Local community representatives will be requested to encourage community participation in the consultation process and also receive feedback from their communities and pass this on to the Project via the Community Liaison Officers (**CLOs**) appointed by the Company. The CLOs role is explained further in Sub-section 4.5.4.

4.5.3 Women's Affair Committees

Each mahalla operates a Women's Affair Committee that supports and represents interests of local women living in respective communities. District Hokimiyats also run Women's Affair Committees to protect interests of women, govern and promote participation of women in decision-making and civil society organisations. These committees will be used by the Company to encourage participation of women in the Project exhibition events and will be invited to local focus groups to be arranged in four project districts during the Draft ESIA disclosure period.

4.5.4 Community Liaison Officers

To date (February 2020), the Company has appointed two male CLOs; one each for Kashkadarya and Syrdarya regions. The Project will appoint two additional female CLOs, one for each region. So in total, there will be four CLOs, one male and one female for each region.

CLOs will be responsible for community liaison and arranging communications with the Project-affected communities throughout the Project preparation and operation in their respective regions. The CLOs will document and record all stakeholder engagement as detailed within the SEP and will evaluate stakeholder engagement performance to inform respective SEP updates. They will be responsible for implementation of the SEP in their respective regions and receiving and channelling comments and concerns during the ESIA phase. They will be attending and recording stakeholder engagement activities and maintain the grievance mechanism. The Project CLOs will report to the Company's Director. Contact details of the CLOs are provided in Section 4.4.

4.5.5 Interaction with NGOs

The Project (via CLOs) will establish contacts and engage local and international NGO, including active participation in third-party monitoring missions and will invite inspectors and observers to the Project sites for audits and visits. The Project CLOs will report to lenders any contacts with the NGOs as a part of SEP reporting.

4.5.6 ESIA Consultation and Disclosure

4.5.6.1 Project Information Disclosure

Operating in the country since 2010, the Sponsor has been disclosing information about the Project since 2017 via direct communication with stakeholders, its website, official announcements, mass media coverage.

FE “Indorama Agro” LLC has a very good partnership with the regional and districts hokimiyats with established regular communication. District Hokimiyats will provide support to the Company in disclosing Project information and engaging local farmers and communities and arranging Project exhibition events in the area.

All the Project documents will be disclosed in the Uzbek language. Respective advertisements will be placed for one week in local newspapers, via the Project website (www.indorama-agro.com) and Hokimiyats’ webs-sites in the Project districts. where the ESIA Scoping Report and SEP are available for review identifying where to locate the documents and how to submit comments.

The ESIA Scoping Report and SEP will be published via the Project web-site, Hokimiyats’ webs-sites in Project districts, disclosed via e-mail to interested stakeholders and made available in hard copy upon request in the branch offices on FE “Indorama Agro” LLC and in Tashkent. The Project leaflet with a summary of the Project scoping findings will be made available in hard copy in the ACs via mahallas. All will be provided with comments boxes and feedback forms to allow for anonymous comments to be submitted.

4.5.6.2 ESIA Scoping Phase Consultation

In line with the international best practice and applicable international requirements, the consultation has been undertaken to inform both the ESIA process and Project engagement and disclosure planning.

In July 2019, the initial consultation was undertaken as part of the ESIA Scoping Phase involving:

- Kasbi District Hokimiyat
- Sardoba District Hokimiyat
- Kamashi mahalla including Commission on Women’s Affairs of Kamashi mahalla
- Sardoba and Oqoltyn mahalla
- Environmental Expertise of the Kashkadarya Region
- Employment Support Department in Sardoba district
- Employment Support Department in Kasbi district
- Commission on Women’s Affairs of Oqoltyn District Hokimiyat
- International Finance Corporation Office in Tashkent

The objectives of these engagement activities were to:

- Disclose information about the Project
- Engage the key stakeholders by introducing the ongoing feasibility study and ESIA process
- Identify additional stakeholders, and
- Identify concerns and opportunities to be addressed during the ESIA process.

The scoping consultations identified interests and views on the Project and contributed to identifying suitable forms of stakeholder engagement and communication, as detailed in the Project SEP.

The Scoping Report (Appendix A) provides an overview of dates, participants and key issues raised in the scoping consultation process. All of these activities were in the form of face-to-face meetings and involved representatives from FE “Indorama Agro” LLC, IFC Advisory Project and ESIA Consultant.

Consultation with the Farmers

The Project affected farmers interviewed by the ESIA Scoping Study in two districts of Kasbi and Sardoba described the consultation process and confirmed that they were approached by the Hokimiyats and the Famers Association and that they got a permanent job in FE “Indorama Agro” LLC as a compensation for terminating their LLAs that provides access to a regular income generated through monthly salary payments. The consultation process also established that affected farmers who are now employees of FE “Indorama Agro” LLC are responsible for the land plots they previously used for farming and this approach was applied by the Company to other affected farmers and is treated as informal policy of the Company and corporate responsibility for mitigating social effects of the Project land acquisition process.

4.5.6.3 Impact Assessment Phase Consultation

While drafting the ESIA Report, the Project held another round of stakeholder engagement and consultation activities to inform the gaps in the social baseline, describe details of the Government-led land acquisition process completed for the Project as well as identify, discuss and plan livelihood restoration actions to be implemented by the Project.

A site visit was undertaken from 1-7 December 2019 to have focus group discussions (FGDs) and meetings with Indorama, local government in the affected districts, hokimiyats, farmers' representatives, Indorama workers (both direct and contract farmers) and local community members. The following consultations were undertaken:

- Eleven focus group discussions in four districts, involving:
  - Local communities
  - Women in communities
  - Former farmers, including farmers employed by Indorama
  - Contract farmers
- Short social surveys at each focus group
- Four District Hokimiyats were consulted
- Two Farmers' Associations were consulted

Table 4.2 below provides a list of FGD meetings undertaken.

Table 4.2: Focus group discussions

No.	Date	Region	District	Attendees	Type of attendees
1	2 December 19	Syrdarya	Oqoltyn	7	Women from local communities
2	2 December 19	Syrdarya	Oqoltyn	9	Men from local communities
3	2 December 19	Syrdarya	Oqoltyn	13	Direct farmers (13 men)
4	3 December 19	Syrdarya	Sardoba	10	Women from local communities
5	3 December 19	Syrdarya	Sardoba	11	Direct farmers (3 women and 8 men)
6	4 December 19	Kashkadarya	Kasbi	14	Direct farmers (1 woman and 13 men)
7	4 December 19	Kashkadarya	Kasbi	13	Contract farmers (3 women and 10 men)
8	5 December 19	Kashkadarya	Kasbi	14	Women from local communities
9	5 December 19	Kashkadarya	Kasbi	11	Men from local communities
10	6 December 19	Kashkadarya	Nishon	13	Women from local communities
11	6 December 19	Kashkadarya	Nishon	10	Direct farmers (10 men)
Total				**125**	

Source: Mott MacDonald December 2019

Most participants of the FGDs were very positive about the Project. Direct and contract farmers in particular were positive about working conditions (a stable salary, an eight-hour working day, training, vacation days). The only exception was the direct farmer respondents from Sardoba District, who said that there were no positive impacts from the Project. The main reason expressed for this opinion was that there was an expectation that the Project would hire 630 farmers in the district, whereas it ultimately only hired 20.Also because the recruitment process took several months from November 2018 to July 2019, so that people were unemployed and lost household income during this period. Some commented that men from the local communities went to other regions and countries to find better jobs and earn money and they worked mainly as construction workers.

Participants from the Kasbi district who are now employees of FE "Indorama Agro" LLC, stated that affected farmers who chose not to be employed by Indorama did not trust the Company. Some of the affected farmers migrated from district to earn income as construction workers in other districts. Some of the affected farmers started different businesses.

Direct farmers who participated in the FGD in the Nishon district suggested that some of the affected farmers did not go to work in Indorama because they wanted to change the type of employment or start their own business.

Community members involved in the FGDs were also on the whole positive about the Project. Those in the Nishon district were expecting to become Indorama employees or that their land would be rehabilitated by the Company so that they could start working as direct farmers in the future. Because of delays to the process, these has been some community frustration. This employment of local people as direct farmers will happen to happen once the land rehabilitation process that is currently underway has been completed which is expected in the next two years.

FGDs identified that for local communities, cotton farming is not the only source of income, although it remains to be on of major seasonal earnings for households. Other sources of household income include other farming and agricultural operations (vegetable and melon growing, gardening, sericulture, livestock farming, poultry farming, fishing and fish farming, bee farming, rabbit farming, ostrich farming, agricultural machinery for rent) or non-agricultural or commercial earnings (work in mahallas, office work, pension allowances, milk processing (kaymak, kefir, kurt, etc.), bread baking, sewing work, home weaving (carpets) and trade).

A short socio-economic survey in Uzbek was collected from all participants of the FGDs. These were collated and used along with the FGDs to inform the socio-economic baseline section (Section 5.2) and Livelihood Restoration Plan. A total of 114 surveys were received from communities, direct and contract farmers, including 46 from women.

The following meetings with other stakeholders were undertaken to inform the ESIA study. See Table 4.3 for a list of meetings held.

Table 4.3:Meetings with Project stakeholders

Date	Region	District	Attendees	Type of attendees
3 December 2019	Syrdarya	Oqoltyn	6	Meeting with Oqoltyn District Hokimiyat and Indorama
3 December 2019	Syrdarya	Sardoba	2	Meeting with Sardoba District Hokimiyat and Indorama
5 December 2019	Kashkadarya	Kasbi	6	Meeting with Kasbi Hokimiyat, Indorama and Kasbi Farmers Association
6 December 2019	Kashkadarya	Nishon	6	Meeting with Nishon District Hokimiyat, Indorama and Farmers Association

Source: Mott MacDonald December 2019

These meetings were used to describe the Government-led land acquisition process completed for the project back in 2018, parties involved and their roles, role of the Company and gaps identified in meeting international compliance in respect of land acquisition and livelihood restoration planning (for details refer to Sub-section 5.2.3). Minutes of meetings are included in Volume III: Appendices and Supporting Documents of the ESIA Report.

4.5.6.4 Draft ESIA Disclosure

One week prior to the Draft ESIA Report disclosure advertisements will be placed in local newspapers, on local radio, and Hokimiyats' web-sites for one week identifying dates and locations of the (i) disclosed documents and how to submit comments. The adverts will include links and addresses where the draft ESIA Report and NTS will be accessible in electronic and hard copies.

Two weeks prior to the Draft ESIA Report presentation, advertisements will be placed in local newspapers, on local radio, via the Project web-site and Hokimiyats' web-sites for one week identifying dates and locations of the public exhibition events. The Project will also place advertisements in mahallas in the ACs to make sure that directly affected individuals such as farmers, women, seasonal workers are aware of the events and invited. Letters of invitation will be forwarded to Women's Affair Committees, local environmental authorities and other Project stakeholders, if relevant, to invite key Project stakeholders to participate in the disclosure events.

Comment boxes and feedback forms will be provided in all locations of the Project exhibition to allow for anonymous comments to be submitted. A telephone number and email address for the local CLO will also be provided.

4.5.6.5 Disclosure of the Final ESIA Report

The Draft ESIA Report will be finalised after the 60 days of disclosure and consultation period by incorporating stakeholder comments and queries in the ESIA Report as necessary. A comment and response table will also be released providing information about how the final ESIA has taken into consideration the feedback provided by stakeholders. The Final ESIA Report and documentation will be disclosed via District Hokimiyats' web-sites and on the Company's website as well.

4.5.7 Consultation Planned throughout the Lifetime of the Project

The Project SEP outlines ongoing stakeholder engagement throughout the Project's lifecycle including construction, operation and decommissioning phases. The activities include communications as necessary with village representatives, information disclosure to local communities at key project milestones such as the beginning and end of construction, regular updating of the Project website and social media, updating the SEP and annual Project reporting.

4.6 Community Engagement and Community Asset Programmes

The Project is currently promoting sustainable engagement with local communities to align their interests and make the community a direct stakeholder by creating community asset as a part of the Project. The purpose of creating community asset is to create an income enhancement opportunity for the ACs. A Project Community Engagement Programme (**CEP**) has been designed with the support of IFC Agri Advisory.

The Community Asset Programme (**CAP**) is the first initiative under CEP and Indorama intends to broaden its CEP initiatives going forward. CAP targets at community asset which local community is familiar with and can benefit the most from it. The Company evaluated various options and based on the local capacity, culture and tradition selected to create mulberry plantations close to villages adjoining the ACs.

CAP as a tool for engaging with communities and meeting their aspirations and showing that the Company cares for them and the Project is aligned with their long-term interest of income enhancement and improving their living standards.

Consultation was undertaken by FE "Indorama Agro" LLC and IFC Agri Advisory to plan and prepare the CAP programme. The following are completed and planned consultations:

- September – October 2019 – Develop an Advisory Committee to provide expert guidance in CEP planning and decision making
- October – November 2019- Engage the community in CAP implementation
- October 2019 – March 2020 – Hold public meetings and informational booths at community events
- October 2019 – March 2020 – Establish a two-way channel (dialogue) so that the communities can provide feedback, raise concerns, express their needs and interests, and the Company can continuously keep these communities informed and engaged

Results from Nishon district FGDs found that CAP has educated the women in how to make silk processing more productive and the women are very grateful.

Figure 4.1: Planting mulberry trees

Source: FE “Indorama Agro” LLC

Figure 4.2: Leaves harvesting

Source: FE “Indorama Agro” LLC

CAP has started in 2019 is currently designed for a period of 2026. Mulberry trees will be planted during first three year with the first harvest anticipated in 2021. Mulberry plantation will include 13,888 trees per 1 ha with leave harvest at 97,000 kg per ha. CAP will cover an area of 450 ha in total and will engage two Project regions, four districts, 30 villages, 21,874 households and over 80,000 people by 2026. The Company will provide agronomist support and take care of mulberry plantation during first three years after planting to make sure that trees a growing well and leaves are of good quality. Each household will get 2 boxes (2 seasons) and approximately 1,000 kg of leaves is needed for each box.

CAP intends to establish its own grievance mechanism with various options allowing community members to raise concerns and to have them addressed in a timely manner. It also intends to involve the community in monitoring selected CEP aspects. More details of CEP and CAP are available in Volume III: Appendices and Supporting Documents of the ESIA Report.

4.7 Project Grievance Redress Mechanism

The Project identifies grievance as an actual or perceived problem that might give grounds for complaint. As a general policy, FE “Indorama Agro” LLC will work proactively towards preventing grievances through the implementation of impact mitigation measures (as identified by the ESIA Report and ESMP) and ongoing engagement by the community liaison officers.

Anyone will be able to submit a grievance to the Project if they believe a practice is having a detrimental impact on him or her individually, on the community, the environment, or on their quality of life. They may also submit comments and suggestions.

4.8 Confidentiality and Anonymity

The Project will aim to protect the person’s confidentiality when requested and will guarantee anonymity in annual reporting. Individuals will be asked permission to disclose their identity if this helps the resolution of a particular grievance. Investigations will be undertaken in a manner that is respectful of the aggrieved party and the principle of confidentiality. The aggrieved party will need to recognise that there may be situations when disclosure of identity is required, and the Project will identify these situations to find out whether the aggrieved party wishes to continue with the investigation and resolution activities.

4.9 Grievance Reporting and Resolution

A grievance mechanism, detailed in the SEP, provides a formalised tool for receiving, acknowledging, investigating and addressing grievances, complaints and concerns from the Project-affected communities and individuals as well as interested stakeholders. This aims to offer predictable, transparent and credible processes for all the parties, producing relatively inexpensive, fair and effective results. It also aims to provide a gender-sensitive, inclusive and culturally acceptable process that will be available to all members of the community.

Effective stakeholder engagement aims to build trust and to maintain constructive relationships with the host communities and interested stakeholders, encourage a positive perception of the Project and contribute to its successful development and implementation.

National Grievance Resolution Requirement

Public grievances and complaints are managed in Uzbekistan using an established mechanism in line with RoU Law No.ZRU-378 of 03.12.2014 “On Grievances from Entities and Individuals”. Stakeholders may file their queries via Internet portal https://my.gov.uz/ru. In addition, so called “Public consultation offices” where people can come with their concerns have been functioning since 2017 in each region, district, city and town. The rural population may also access this mechanism in the neighbouring towns or cities.

The RoU Ministry of Employment and Labour Relations operates a feedback mechanism to deal with any labour-related grievances that are investigated by local labour inspectors across the country. This feedback mechanism is accessible via the hotline number (+998) 71 200-06-00 and online bot on the messaging service “Telegram”.

The Federation of Trade Unions also receives and investigates labour-related grievances through the hotline number (0-371) 200 10 92 and via Telegram messaging service.

To achieve national compliance, the Project grievance mechanism will not preclude contacts of the affected persons with the national/governmental legal systems for grievance resolution at any stage of the grievance procedures. Aggrieved parties may take legal action at any stage throughout the grievance review process, not only after using the grievance mechanism. No charge is applied on filing any grievances, comments and/or queries.

Project Grievance Process

The Project will receive and record, categorise, acknowledge, investigate, respond, allow for recourse/appeal and follow-up, and close out grievances.

Receive and record / acknowledge: grievances will be logged in a formal logging system for which the CLO will be responsible. People may register grievances using the form in Appendix A or by contacting the CLO directly, reporting to their settlement representative or online using the Project website. Contact details for the CLO will be included in appropriate Project communication materials such as the Non-Technical Summary.

Categorise: the CLO will classify grievances according to Table 4.4.

Investigate: where investigations are required, Project staff and outside authorities as appropriate, will assist with the process. The CLO will collaborate with the Company management to identify an appropriate investigation team with the correct skills to review the issue raised. The investigation will also aim to identify whether the incident leading to the grievance is a singular occurrence or likely to reoccur. Identifying and implementing activities, procedures, equipment and training to address and prevent reoccurrence will be part of the investigation activities.

Respond/follow-up/close out: the CLO will explain in writing to the complainant (or where literacy is an issue orally) the review process, the results, any changes to activities that will be undertaken to address the grievance and how the issue is being managed to meet appropriate environmental and social management systems. In some cases, it will be appropriate for the CLO to follow up at a later date to see if the person or organisation is satisfied with the resolution or remedial actions.

Table 4.4: Grievance classification criteria

Classification	Risk Level (to health, safety or environment)	Response
Low	No or low	The grievance may not be related to Project performance, it may be a comment, or a request. CLO will acknowledge complaint within 7 days and conduct an investigation if required. The CLO will document findings and provide a response within 15 days of receiving. Response is likely to have minimal cost in addition to time spent on addressing the issue.
Medium	Possible risk and likely a one-off event	CLO will acknowledge complaint within 7 days. The CLO and an appropriate investigation team will conduct investigation. The Site Manager or EHS Officer may decide to stop work during the investigation to allow the corrective preventive

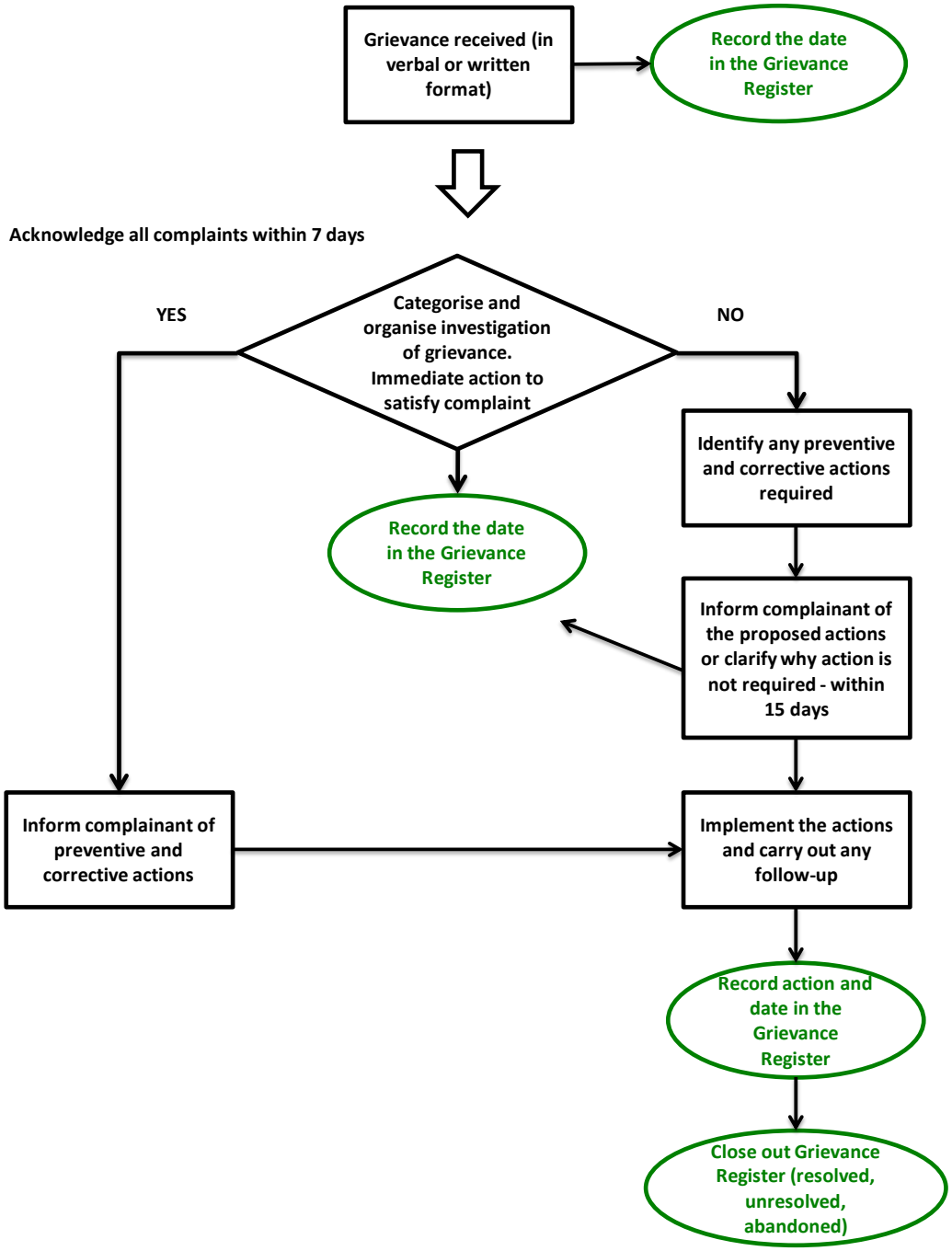
Classification	Risk Level (to health, safety or environment)	Response
		actions to be determined. The CLO will provide a response within 15 days of receiving complaint. The corrective action is likely to be straight forward involving changing a piece of equipment or procedure which does not take long or have substantial cost implications to implement.
High	Probable risk and could reoccur	CLO will acknowledge the complaint within 7 days and will get the Project Manager to organise a major investigation team for prompt investigation and resolution. Work may be stopped in the affected area. The CLO will provide a response within 15 days of receiving complaint. If more time is needed to complete the investigation this will be communicated to complainant within 15 days of receiving complaint. As necessary the response will include a press release. The corrective action may be complex or sensitive involving changing equipment or a procedure which requires training of staff and has substantial cost implications.

Grievance will be closed out in the register as:

- **Resolved**. The resolution has been communicated, agreed and/or implemented.
- **Unresolved**. The complainant did not accept the proposed resolution and has appealed to other entities for resolution.
- **Abandoned**. The complainant is no longer contactable and efforts to trace whereabouts have been unsuccessful.

The CLO will summarise grievances weekly during construction and bi-annually during operation removing identification information to protect the confidentiality of the complainant and guaranteeing anonymity. The procedure will be at no cost and without retribution to Project affected persons and stakeholders. The grievances processing procedure is depicted in Figure 4.3.

Figure 4.3: Flowchart for Processing Grievances



The Company has nominated Ravshan Tadjiev in Kashkadarya region and Jasur Khusankhodjaev in Syrdarya region, as the Project CLOs and point of contact for grievances and comments in their respective regions. Grievances and comments should be sent to the contacts below, where possible by using the form provided in Stakeholder Engagement Plan (Appendix A).

Table 4.5: Project Community Liaison Officers

Contacts	Project CLO in Kashkadarya region	Project CLO in Syrdarya region
Company:	FE “Indorama Agro” LLC, Kashkadarya Branch	FE “Indorama Agro” LLC, Syrdarya Branch
Name:	Ravshan Tadjiev TBN	Jasur Khusankhodjaev TBN
Tel.:	+998905066863	+998998212000
Email:	rtadjiev@indorama.uz	jkhusankhodjaev@indorama.uz

Source: FE “Indorama Agro” LLC

5 Social Impact Assessment, Management and Monitoring

5.1 Methodology and Assessment Criteria

5.1.1 Introduction

This Chapter describes the approach, methodology and social impact and risk assessment criteria, social baseline, predicted likely impacts, mitigation and enhancement measures, and the conclusions of the Social Impact Assessment (**SIA**). The Chapter looks at how people and communities may be affected as a result of the Project in terms of the way they live, work and interact with one another on a day-to-day basis.

The broad objectives of the SIA are to ensure that key potential socio-economic and community impacts have been identified, assessed, mitigated and managed in a consultative and constructive manner. The primary purpose of the SIA is to safeguard the wellbeing of the Project affected communities, prevent or avoid negative impacts, and where possible, improve people's lives by sharing Project benefits with local communities.

5.1.2 General Approach

The SIA undertaken for this international ESIA has been carried out to meet the requirements of the EBRD and IFC as well as World Bank Group EHS Guidelines and ILO fundamental conventions with a focus on labour and working conditions and prohibition of child and forced labour. The approach and methodology draw on the Guidance Note for Assessing and Managing the Social Impacts of Projects by the International Association for Impact Assessment (**IAIA**). The IAIA[14] conceptualises social impacts as changes to one or more of the following:

- People's way of life – how they live, work, play and interact with one another on a day-to-day basis
- Their community – Its cohesion, stability, character, services and facilities
- Their culture – their shared beliefs, customs, values and language use
- Their environment – the quality of the air and water people use; the availability and quality of the food they eat; the level of hazard or risk, dust and noise they are exposed to; the adequacy of sanitation; their physical safety; and, their access to and control over resources
- Their health and wellbeing – whereby health is a state of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity; perceptions of safety
- Their personal and community property rights – access issues; how people are economically affected and experience personal disadvantage or advantage.

5.1.3 SIA Spatial Scope

This SIA used geographical and administrative boundaries to define the Project's "areas of influence" taking into consideration how local communities collaborate, are merged and/or self-governed, how geographical boundaries exist and influence the Project functioning. These AoIs are:

- The wider AoI:
  - Kashkadarya region divided into 13 administrative districts, with the centre in Karshi and other major cities being Shakhrisabz, Kitab, Kasan, Mubarak, Yakkabog, Guzar and Kamashi.
  - Syrdarya region divided into eight administrative districts with the centre in Gulistan and other major cities being Yangier, Syrdarya, Shirin and Bakht.
- The local AoI:
  - Kasbi and Nishon districts of Kashkadarya region (Map 1.2), and
  - Sardoba and Oqoltyn districts of Syrdarya region (Map 1.3).

[14] IAIA. Social Impact Assessment: Guidance: Assessing and Managing the Social Impacts of Projects, April 2015.

The wider AoI is used to assess the overall trends specific to the locality of the regions and estimate, where data is not available, the likely conditions in the local AoI.

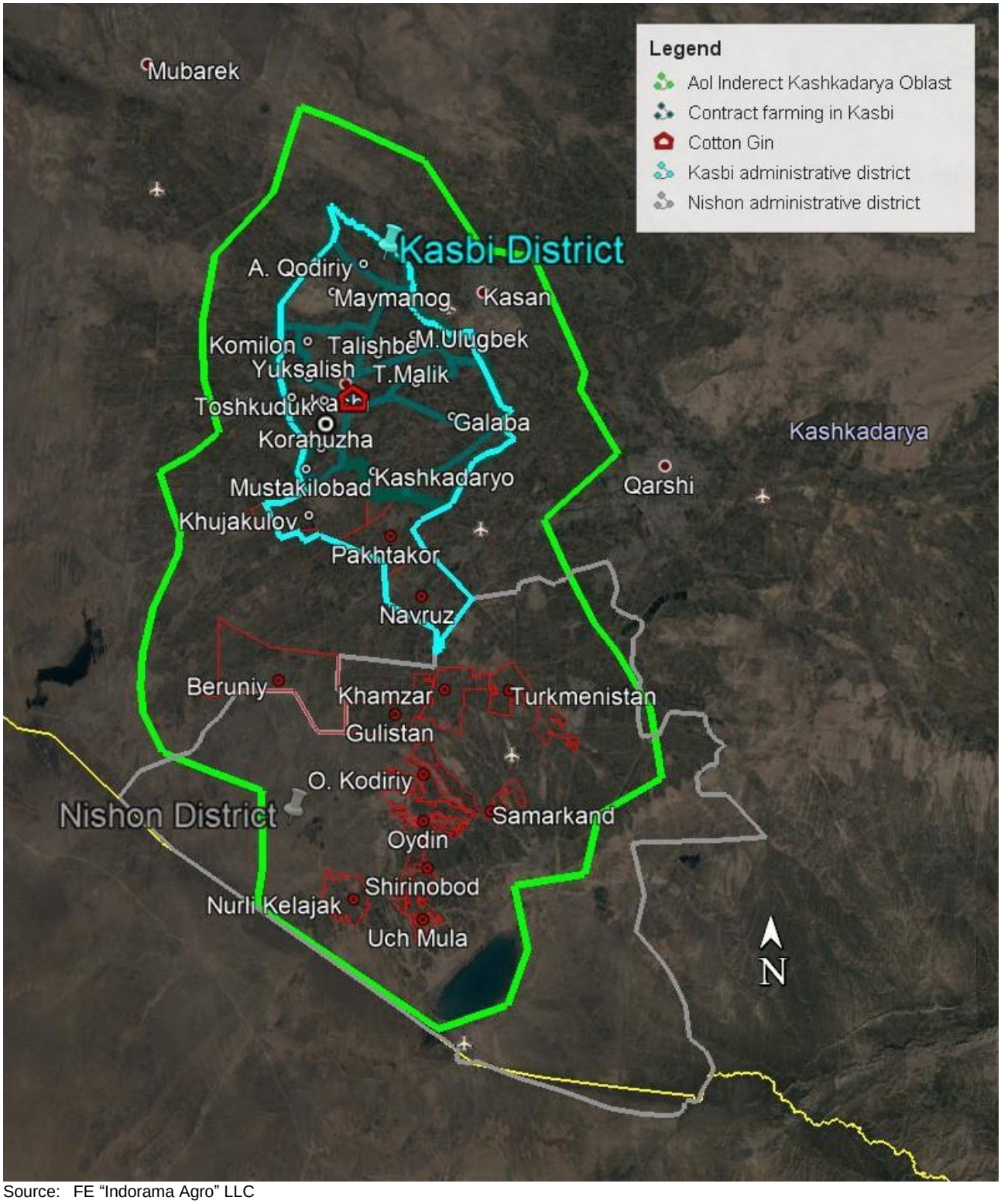
5.1.3.1 Areas of Direct and Indirect Influence

Within the local AoI of the Project the SIA established two areas: the “Area of Indirect Influence” and the “Area of Direct Influence”.

Area of Indirect Influence

The area within 10 km zone from the boundaries of the Project constitute the Areas of Indirect Influence in Kashkadarya and Syrdarya regions as shown in Map 5.1 and Map 5.2.

Map 5.1: Area of Indirect Influence – Kashkadarya region

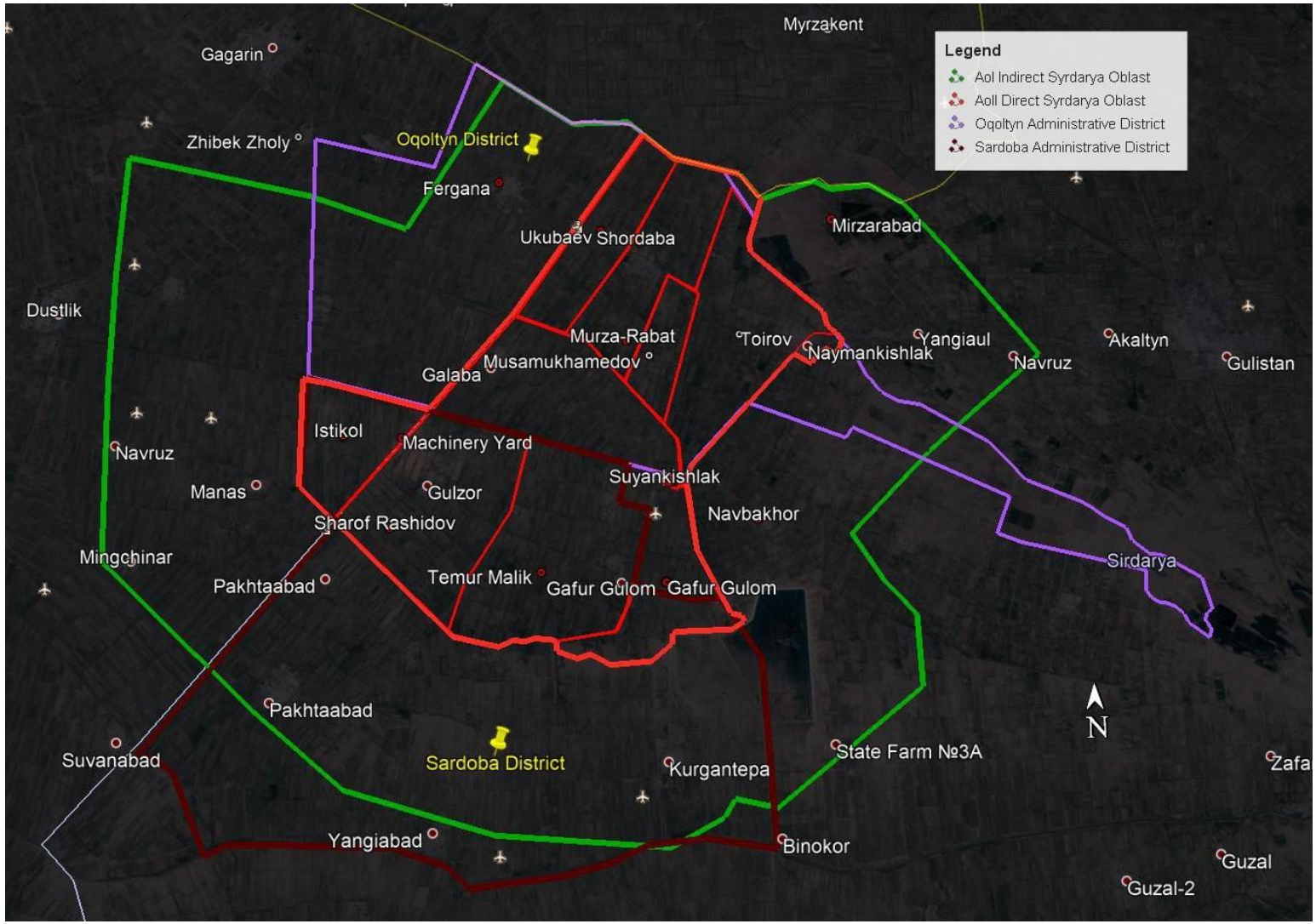


Source: FE “Indorama Agro” LLC

The national border with Kazakhstan at the edge of Oqoltyn district limits the Area of Indirect Influence to the Project boundary[15] (Map 5.2).

[15] The Project will not involve labour from Kazakhstan. Labour migration tends to flow from Uzbekistan to Kazakhstan and Russia as salaries and conditions of work are better there. The Project intends to have all employees from the ACs or neighbouring communities to limit labour in-migration.

Map 5.2: Area of Indirect Influence – Syrdarya region



Source: FE “Indorama Agro” LLC

The Area of indirect Influence AoI comprises communities located within 10 km from the Project boundaries, defined as the outer boundaries of the farmland included within the Project (where the gins are also located) including the area of contracted farming This approach is driven by the agricultural nature of the location and low-density population within the Project AoI with strong and expanded family connections and perception of distance by local communities when people feel comfortable to find jobs, provide services or benefit other ways from the relatively remote Project.

Table 5.1: Indirectly affected communities in Kashkadarya and Syrdarya regions

Kashkadarya Region			Syrdarya Region	
Kasbi District Mahallas		Nishon District Mahallas	Sardoba District Mahallas	Oqoltyn District Mahallas
Aqzhantal	Maymanoq-1	Azad (A. Qodiriy mahalla)	Gumbaz	Barlas
Baydakchy	Maymanoq-2	Balkhiyak	Qurg'ontepa	Buston
Beruniy	Mesit	Charagan	Pakhtaabad	Fergana
Chavkay	Muglan	Dustlik (Oydin)	Pakhtaabad township	
Chilimbash	Mustakylabad	Dzhayran	Titov State Farm	
Chimkurgan	Navkat	Gulistan (Kaptari makalla)	Yangiabad	
Dorman	Nazartepa	Istiqboi	Yangiqishloq	
Duraza	Nurobod	Mekhnatabhad (Kuksoy)		
Esabay	Pandiran	Pakhtazar		
Kadyrabad	Sargudzhum	Yangi Nishon		
Kamashi	Shakardzuy			
Karakhodzha	Talishbe			
Karakungyrat	Talliulgun			
Karatepa	Tashkuduk			
Karshi	Tashkurgan			
Kasbi	Tersaul			
Kazak	Ukatar			
Kerait	Unikki			
Khitai	Uyrat			
Khodzhakhairan	Uqsalish			

Source: Mott MacDonald

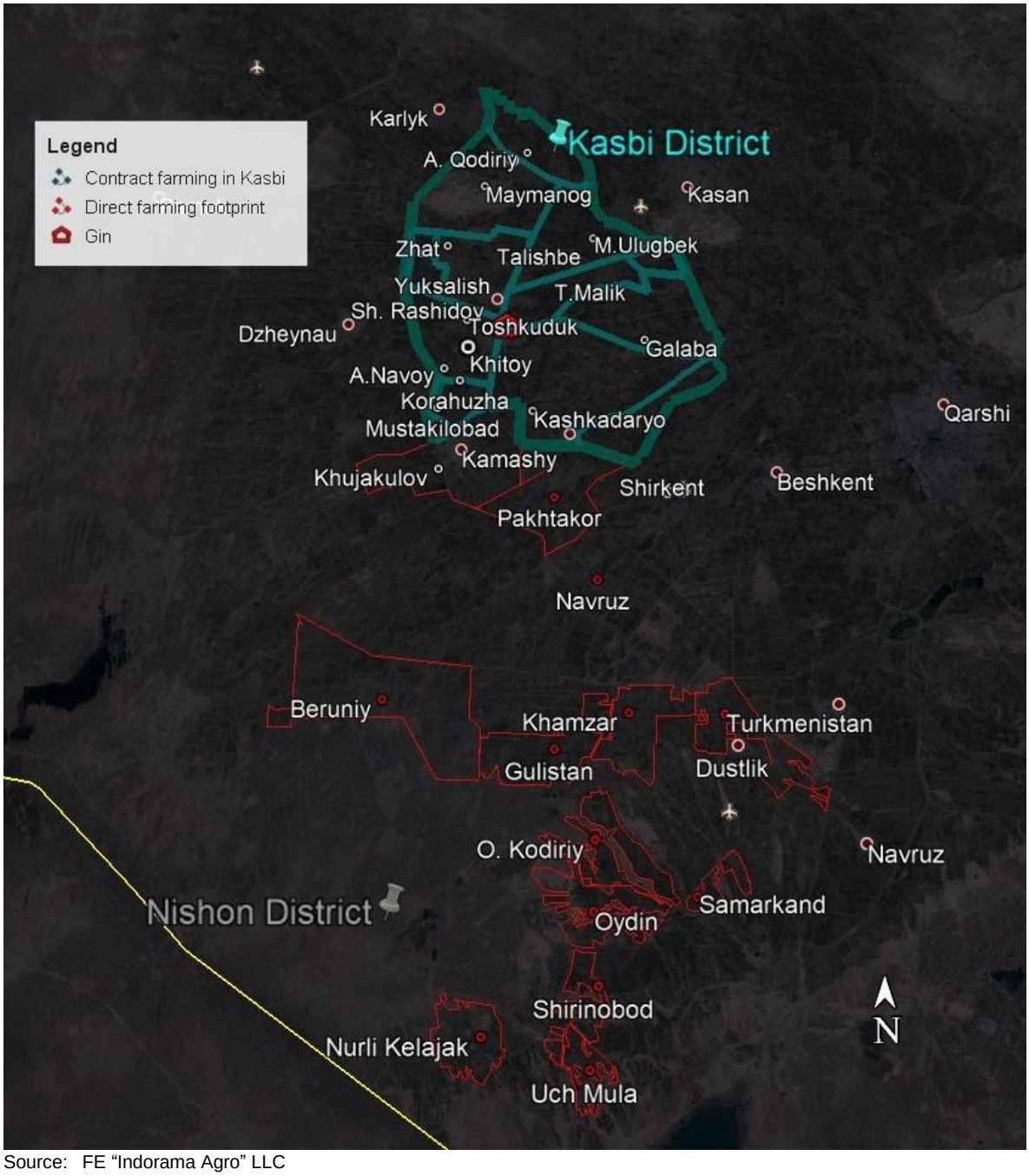
Other neighbouring settlements beyond the administrative boundaries of these four districts that are indirectly affected by the Project include:

- Jizzakh district: Manas, Mingchinar, Navruz
- Mirzaabad district: Binokor, State Farm No.3A, Husnabod, Navbakhor, Navruz, Naymankishlak, Nurafshon, Urustepa, Yangiaul, Yuldoshobod
- Myrishkor district: Elabad, Gulistan, Komsomolabad, Mirichkar, Shirinkuduk, Yangi-Mishkor.

Area of Direct Influence

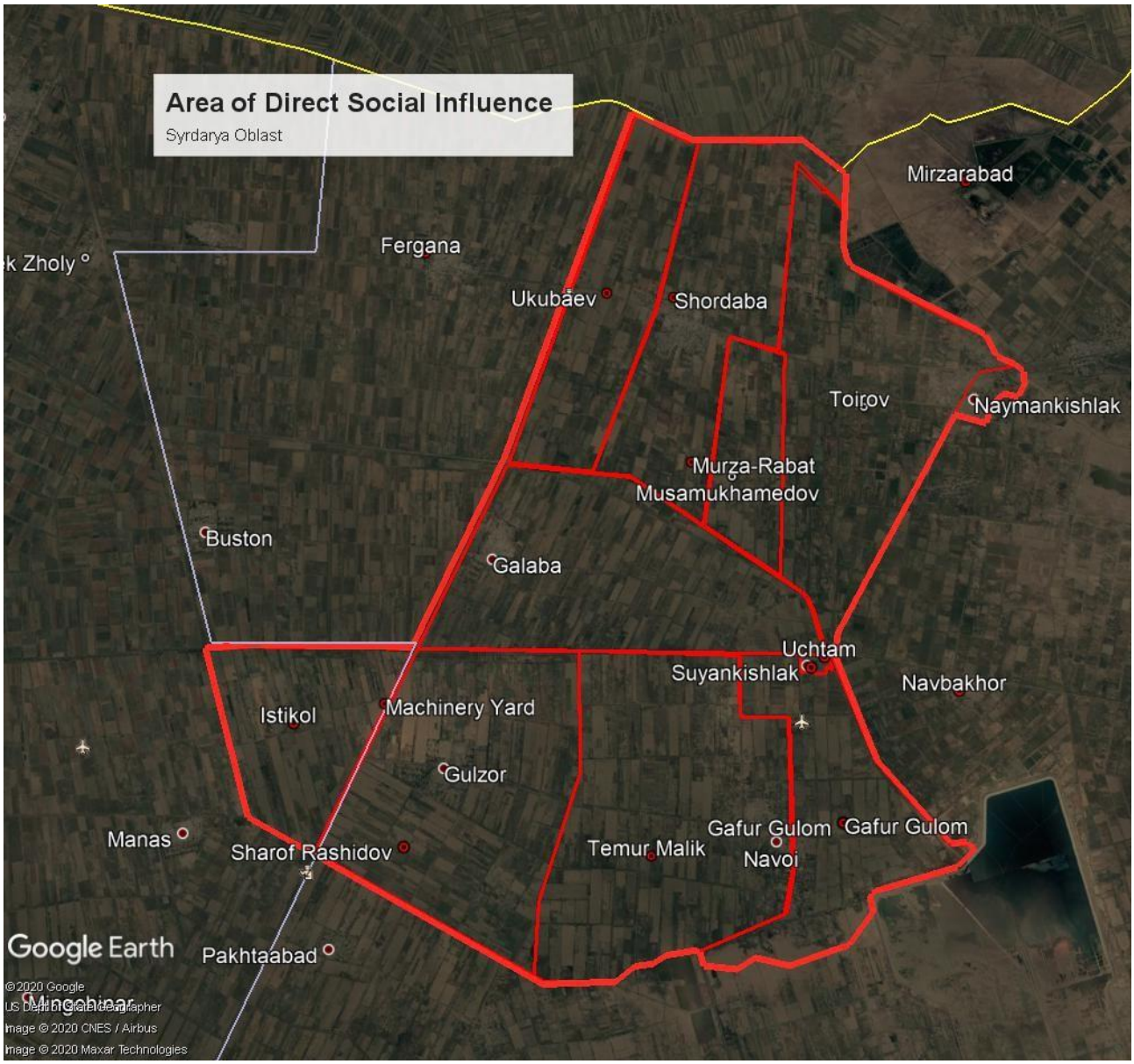
All communities within the Project footprint (the boundaries of the farmland affected by the Project, boundaries of two gin plants and two residential complexes in the cities), are considered to be directly affected by the Project as they will be exposed to E&S impacts during the various phases of the Project (planning and pre-construction, development/construction, operation and decommissioning/closure. This zone is considered to be the Area of Direct Influence as depicted in Map 5.3 (referring to Kashkadarya region) and Map 5.4 (describing Syrdarya region).

Map 5.3: Area of Direct Influence in Kashkadarya region



Source: FE “Indorama Agro” LLC

Map 5.4: Area of Direct Influence in Sardoba region



Source: FE “Indorama Agro” LLC

Some communities (Azad, Balkhiyak, Denav, Gulistan (Kaptari makalla), Dustlik (Oydin), Dzhayran, Istiqboi, Karkara, Yangikyrkkulach) are located beyond the Project boundaries but in the immediate vicinity to Project sites so that they will be exposed to impacts during all phases of the Project life cycle and thus are considered by the assessment to be directly affected. Additionally, farmers and farm workers who have lost their jobs because of the Project are considered to be directly affected, even if they reside outside of the Area of Direct Influence.

Table 5.2 below provides a summary of directly affected communities in the Project local AoI. One or more villages may be governed by a respective Community Council (Qishloq Fuqarolar Yig'ini or **QFY**) or Community Assembly (Mahalla Fuqarolar Yig'ini or **MFY**), jointly referred to as “**mahallas**”.

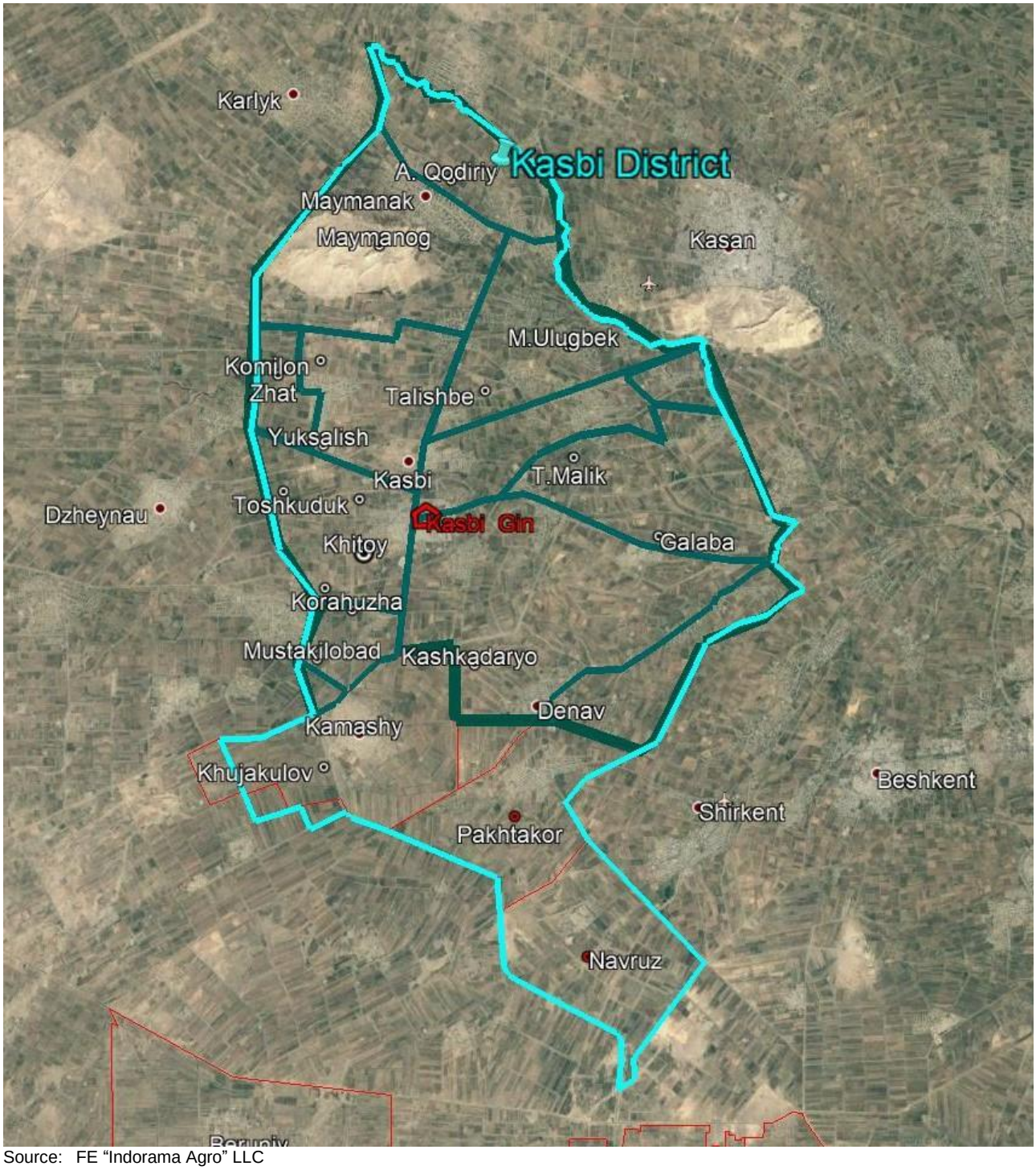
Table 5.2: Directly affected communities in Kashkadarya and Syrdarya regions

Kashkadarya Region		Syrdarya Region	
Kasbi District	**Nishon District**	**Sardoba District**	**Oqoltyn District**
Chulquvar QFY	A. Qodiriy QFY	Birlik MFY	A. Navoiy MFY
Denov QFY	Balkhiyak MFY Katta Amkhor	Dustlik MFY	Ahillik MFY
Fazli MFY	Istiqboi MFY	Qurg'ontepa MFY	Dustlik MFY
Jarkucha MFY	Kaptari MFY	Ota Yurt MFY	Kurkam Diyor MFY
Kamashi MFY	Kuksoy MFY	Yortdosh MFY	Sakhovat MFY
Khujaki MFY	Oydin MFY		Shodlik MFY
Mushqoqi MFY	Qirqquloch QFY		
Nazartepa MFY	Shirinobod MFY		
Nurobod MFY	Yangiobod MFY		
Pakhtakor QFY			

Source: Analysis by Mott MacDonald

Apart from directly and indirectly affected communities, the Project local AoI includes the area of 12,536 ha for contract farming with 394 contracted farmers involved in Kasbi district, who are considered to be directly affected by the Project. Contract farming sub-districts are shown in the map below.

Map 5.5: Contract farming sub-districts in the Area of Direct Influence



Source: FE “Indorama Agro” LLC

5.1.4 SIA Temporal Scope

The Project has been assessed by comparing the existing social conditions (ascertained by document review and site visits) with the change expected over time as a result of the Project. The temporal scope of social impact assessment includes the following Project phases which are not necessarily chronological and overlap since farming operations were initiated at the start of 2019.:

- Land development/construction phase:
  - Agricultural land rehabilitation – January 2019 until approximately January 2021
  - Two gin plants - September 2019 to February 2020 (approximately five months)
  - Two residential complexes - September 2019 to April 2020 (approximately seven months)
  - Transmission line – timeline not yet confirmed (approximately three months)
- Operation: land lease commences December 2018 and will run for 49 years until 2067
- Closure and decommissioning: this applies to the gin plants and the lifetime is not known at this time, but the decommission should take less than a year

The Project lifetime is expected to last at least 49 years and an assessment of any works necessary to keep the Project plants and facilities operating will be undertaken at that time.

5.1.5 SIA Baseline

The baseline conditions are those assumed to be prevailing immediately prior to the start of site preparation.

5.1.5.1 Desk Study and Field Reconnaissance

Information for this SIA has been obtained from a number of sources including data of site visits, available Project studies, FE “Indorama Agro” LLC operational and environmental permitting documentation, formal information requests to local government organisations and communities. A Social Baseline Study for this Project was undertaken by Mott MacDonald in July-September 2019. Community-level information for the Social Baseline Study was obtained via formal information requests and informal interviews with mahalla representatives. Further information has also been gained through the consultation activities with key Project stakeholders detailed in Chapter 4, as well as through in-depth structured interviews by Mott MacDonald with the Company’s staff and human resources (**HR**) officers, representatives of the Farmers’ Association and local employment centres. These sources have been supplemented with widely available literature, data from websites and other official sources of information, including:

- National Statistics Office of Uzbekistan
- International Labour Organisation
- World Health Organisation (**WHO**)
- World Bank
- International Development Association
- CIA World Factbook
- UNAIDS
- Minority Rights Group
- Countries and their Cultures Forum
- World Economic Forum
- OECD Library.

Socio-economic data for Uzbekistan, Kashkadarya and Syrdarya regions and the four Project districts has been collected and reviewed in the assessment. Where available, mahalla level data for communities in the local AoI are used to provide more detail and depth. Where mahalla level data are presented, it has been sourced through information requests or interviews with mahallas representatives and can be considered as estimated, but valuable, information.

5.1.6 Determining Significance of Social Impacts and Effects

Determining the significance of socio-economic and community impacts has enabled the avoidance of impacts, the identification of necessary mitigation and benefit enhancement measures as well as an indication of the related financial costs associated with the social impacts of the Project. Consideration has been given to identification of both potentially beneficial and adverse social impacts which have been assessed by comparing the quality of the baseline conditions with the predicted quality of the social environment once the Project is fully in place.

The significance of an effect has been determined by the interaction between its magnitude, and the sensitivity of receptors affected, as depicted in the significance matrix shown in Chapter 3. Professional judgement has been used by qualified social scientists when assigning significance.

The use of these two concepts for this SIA is outlined below.

Sensitivity Criteria

The sensitivity of receptors has been estimated through consideration of their socio-economic vulnerability, measured by their capacity to cope with social impacts that affect their access to or control over additional or alternative social resources of a similar nature, ultimately affecting their wellbeing. Sensitive or vulnerable receptors are generally considered to have less means to absorb adverse changes, or to replicate beneficial changes to their resource base than non-sensitive or non-vulnerable receptors.

When considering sensitivity, the type of resources in question varies between receptors. For example, a community's vulnerability has generally been measured in terms of its resilience to loss of community facilities, whereas an individual's vulnerability has generally been considered in relation to their resilience to deprivation and loss of livelihood assets or opportunities (such as jobs, productive land or natural resources). Impacts that increase impoverishment risks contribute to vulnerability. Impoverishment risks include landlessness, joblessness, homelessness, marginalisation, increased morbidity and mortality, food insecurity, loss of access to common property resources and social disarticulation. Table 5.3 below presents the guideline criteria that have been used to categorise the sensitivity of receptors.

Table 5.3: Sensitivity criteria

Sensitivity of Receptors	Definition
High	An already vulnerable social receptor with very little capacity and means to absorb proposed changes or with very little access to alternative similar sites or services.
Medium	An already vulnerable social receptor with limited capacity and means to absorb proposed changes or with little access to alternative similar sites or services.
Low	A non-vulnerable social receptor with some capacity and means to absorb proposed changes and with some access to alternative similar sites or services.
Negligible	A non- vulnerable social receptor with plentiful capacity and means to absorb proposed changes and with good access to alternative similar sites or services.

Source: Mott MacDonald

Magnitude Criteria

The magnitude of an impact has been determined by consideration of the extent to which it results in social receptors gaining or losing access to or control over socio-economic resources resulting in a beneficial or adverse effect on their individual and collective wellbeing. Wellbeing is considered as the financial, physical and emotional conditions and quality of life of people and communities.

For beneficial impacts, the extent to which local wellbeing is likely to be enhanced has been considered. This is in accordance with the international movement in SIA practice towards an increased focus on enhancing long-term development benefits for local communities and/or farmers' sustainability, as opposed to only considering mitigation of adverse effects. As such, the magnitude criteria include consideration of the extent to which benefits are shared with and or realised by local people and communities.

The assessment of magnitude has been undertaken in two steps. Firstly, key social impacts associated with the Project and their related beneficial and adverse, direct and indirect, and cumulative effects have been identified. Secondly, the magnitude of impacts and effects have been categorised as either major, moderate, minor or negligible based on consideration of the parameters listed below along with professional judgement:

- Type of impact
- Duration
- Spatial extent
- Reversibility
- Likelihood
- Number of people or groups affected
- Benefit sharing.

Table 5.4 summarises the typical varying degrees of impact magnitude.

Table 5.4: Magnitude criteria

Magnitude (Beneficial or Adverse)	Definition
Major	A highly likely impact that would have implications beyond the project life affecting the wellbeing of many people across a broad cross-section of the population and affecting various elements of the local communities', or workers', resilience.
Moderate	A likely impact that continues over a number of years throughout the project life and affects the wellbeing of specific groups of people and affecting specific elements of the local communities', or workers', resilience.
Minor	A potential impact that occurs periodically or over the short term throughout the life of the project affecting the wellbeing of a small number of people and with little effect on the local communities', or workers', resilience.
Negligible	A potential impact that is very short lived so that the socio-economic baseline remains largely consistent and there is no detectable effect on the wellbeing of people or the local communities' or workers', resilience.

Source: Mott MacDonald

5.2 Social Baseline Conditions

5.2.1 Project Country and Region Information

Uzbekistan is Central Asia's most populous country. Having an area of 447,000 km^2 (like California or Spain), Uzbekistan is the only Central Asian state to border all the other four, and one of the world's only two doubly landlocked countries, meaning that it is surrounded by landlocked countries. It also shares a short border with Afghanistan to the south and with Turkmenistan to the south-west. It is the 56th largest country in the world by area and the 42nd by population. Most of the country's population is concentrated in urban areas.

Syrdarya region is located in the centre of the country on the left bank of the Syr Darya River. It borders with Kazakhstan, Tajikistan, Tashkent region and Jizzakh region of Uzbekistan. The region covers an area of 4,276 km^2 and is mostly desert, with the Starving Steppe taking up a significant part of the region's area. The region is divided into eight administrative districts. The population is estimated to be around 829,900 (as of 01.01.2019) and distributed along the main highway, which divides the whole region into two parts: the western and eastern. Uzbeks are a major ethnic group, with Tajik minorities in the south on the border with Tajikistan (mainly in Khavast district). The economy is based on cotton and cereal crops, with strong reliance on irrigation and on cattle breeding. Minor crops include forage plants, vegetables, melons, gourds, potatoes, maize, a variety of fruit and grapes. There are over 6,000 farms in the region with the average area of 40 ha[16] allocated per farm. The share of gross agricultural output in Gross Domestic Product (**GDP**) totalled at 43% in 2016. Industry involves production of construction materials, irrigation equipment and raw-cotton processing. The Syrdarya region accommodates one of Uzbekistan's largest hydroelectric power plants), which generates one third of the country's electricity.

Kashkadarya region is located in the south-eastern part of the country in the basin of the Kashkadarya River and on the western slopes of the Pamir-Alay mountains. It borders with Surxondarya region to the southeast, Bukhara region to the northwest, Navoiy region and Samarqand region of Uzbekistan to the north, Lebap region of Turkmenistan to the west, and with Penjikent district of Sughd region of Tajikistan to the east. It covers an area of 28,570 km². The climate is typically arid continental climate and partly semi-tropical.

[16] Farm Restructuring in Uzbekistan: How did it Go and What is Next? January 15, 2019

Significant petroleum and gas-condensate reserves are located in the area: Shurtan, Alan, Pamuk, Tavakkal, Hudjum, etc. The population of the region totals at 3,213,100 (as of 01.01.2019).

The main industrial sectors are fuel and energy, building materials, light industry, food industry, particularly flour and cereals. The region occupies the first line in the country's rating for hydrocarbon crude production (oil, gas, gas condensate) and natural gas processing. There are over 16,000 farms in the region. The share of gross agricultural output in GDP was 26% in 2016. Farms are small, with average size of 43.6 ha and 4 workers. The region's major crop is wheat (as of 2017) with the cultivated area of 235,700 ha and average crop yield of 3,87 tons/ha. In 2017, 85% of wheat was harvested by private farms. The second major crop is cotton with a harvest of 424,000 tons from the area of 162,600 ha in 2017.

5.2.2 Cotton Clusters Concept in Uzbekistan

5.2.2.1 Definition

The GoU is implementing cotton clusters in all regions of Uzbekistan. With no formal definition of the "cotton cluster" term, the concept describes a transaction whereby the GoU allocates land to a private investor who in return commits to growing cotton and establishing cotton processing and/or manufacturing facilities in the local area. The clusters' main objectives are to:

- Reduce the role of the government in cotton production
- Create local jobs
- Position Uzbekistan as an exporter of textiles and garments rather than raw cotton.

There are two types of cotton clusters in Uzbekistan:

1. Contract farming clusters – these make contract arrangements with farmers and are engaged in fibre cotton processing (downstream business), however some land is often managed and farmed directly by such cotton clusters.
2. Direct farming clusters – these farm land directly and use it for their textile enterprises.

The Association of the Textile and Clothing Industry (Uztextileprom) coordinates the cluster activities.

5.2.2.2 Recent Cotton Sector Reforms

The GoU has been improving performance of the cotton sector since 2017 with the following measures taken to reform the economy:

1. Partial liberalization of the markets for fertilizers, agricultural chemicals, and other inputs
2. Increased state procurement price for cotton in nominal terms, however due to high inflation rates (13-18%) the price increase in real terms was much smaller:
   a. from 1,218,000 UZS/ton in 2016 to 1,905,000 UZS/ton in 2017
   b. from 1,905,000 UZS/ton in 2017 to 3,250,000 UZS/ton in 2018
3. Selling of cotton processing's sub-products at the commodity exchange; and
4. 'Freezing' the debts of farms and agricultural input suppliers to restart economic activity within the cotton value chain[17]

5.2.2.3 Background and Current Status of Cotton Clusters

The first cotton cluster was organised in 2017 in Navoi region by the textile factory in Kyzyltepinsky district and achieved significant improvements within one year through: (i) attracting commercial credit, (ii) securing cooperation with local farmers, (iii) raising the farm-gate price of raw cotton (by 15-20%) and thus protecting farmers from losses, (iv) reducing ginning expenses (by 50%) and increasing ginning outturn (by 1.5-2%) to save funds for expansion of the textile capacity and (v) replacing export of cotton fibre (at USD 5 million) by

[17] Decree of the RoU Cabinet of Ministers No.158 of 02.03.2018 "On Additional Measures to Strengthen Payment Discipline and Reduction of Debts in Key Sectors of the Economy" and Decree of the RoU Cabinet of Ministers No.149 of 28.02.2018 "On Measures for Wide Adoption of Market Approaches in Agriculture".

export of textile products amounting to USD 20 million. These positive results led the GoU to pilot more clusters by establishing on cluster in each region in 2018[18] including 13 clusters with contract farming and 2 clusters with direct farming, all operated on the area of 141,000 ha.

In 2019 the plan is to have a total of 64 clusters by the end of 2019 to cultivate half of the country's cotton area.

Table 5.5: Textile clusters in Uzbekistan, 2019

No.	Region	Total Clusters	Clusters' Cotton Area, ha	Cotton Area in the Region, ha	Share of Clusters' Cotton Land
1	Republic of Karakalpakstan	2	18,700	86,291	22%
2	Andijan	9	61,315	79,391	77%
3	Bukhara	7	32,450	97,900	33%
4	Jizzakh	2	8,500	78,100	11%
5	Kashkadarya	6	53,450	135,900	39%
6	Namangan	7	55,304	63,406	87%
7	Navoi	2	3,800	32,588	104%[19]
8	Samarkand	5	33,300	75,580	44%
9	Surkhandarya	6	52,480	74,078	71%
10	Syrdarya	2	31,500	72,557	43%
11	Tashkent	6	68,720	73,001	94%
12	Fergana	6	36,610	82,080	45%
13	Khorezm	4	35,135	82,757	42%
TOTAL		**64**	**491,264**	**1,033,629**	**50%**

Source: Decree of the RoU Cabinet of Ministers No.632 of 08.08.18 "On Measures to Establish the Modern Cotton-Textile Production by Indorama (Singapore) in Uzbekistan"; Decree of the RoU Cabinet of Ministers No.744 of 19.09.18 "On Additional Measures to Further Develop Cotton-Textile Production" and Decree of the RoU Cabinet of Ministers No.974 of 01.12.2018 "On Measures to Establish the Modern Agro-Industrial Cluster in Kuychiriksky District, Tashkent Region"

The cotton cluster of Indorama will thus operate 20% of the cotton area in Kashkadarya region and 26.5% of the cotton area in Syrdarya region along with other six clusters based in these regions (five clusters in Kashkadarya region and one more cluster in Syrdarya region).

The current status of the cotton cluster may be described against the following observations:

- Few cotton clusters (15) have operated for almost two years (2018 harvest) while the majority is operational for less than a year (2019 harvest)
- Most cotton clusters have not yet rolled out their full operations
- Relationships with farmers are still in the process of testing and development
- It takes time to change the minds of farmers and other stakeholders, develop local skills and improve cotton farming technologies.

Cotton clusters have started to modernise the cotton value chain in Uzbekistan by injecting new capital, innovations and private solutions.

5.2.2.4 Anticipated Results of Cotton Clusters

In promoting involvement of the private sector in the concept of cotton clusters the GoU[20] anticipates the following key results:

[18] Decree of the RoU Cabinet of Ministers No.53 of 25.01.18 "On Measures to Adopt the Modern Forms of Cotton-Textile Production" via the following link http://lex.uz/docs/3527483

[19] In Navoi region, more cotton land is allocated to clusters than is available in the entire region. It implies that about 1,500 ha of non-cotton land will have to be reallocated to cotton production or the clusters would have to give away some of the initially allocated land, as was the case with "RusUzbekTex" cluster in Fergana region, from which 620 ha of the initially allocated cotton land were taken away.

[20] Third Party Monitoring of Child Labour and Forced Labour during the 2018 Cotton Harvest in Uzbekistan, ILO, April 2019

1. **Clusters to improve agricultural outcomes** – through (i) cooperation with farmers and establishment of advisory services for farmers; (ii) adoption of best global practices and attraction of world-class experts; (iii) upgrading agricultural machinery and equipment, introduction of mechanized harvesting of cotton; (iv) adoption of water- and other resource-saving technologies; (v) reclamation of abandoned land and bringing it back into farm production; (vi) improvement of soil fertility. These improvements are expected to:
   a. Increase cotton yields
   b. Ensure an efficient use of resources
   c. Increase the number of better-paid rural jobs, and
   d. Improve infrastructure and business environment in rural areas.
2. **Clusters to act as the instrument of industrialisation** – by building relationships with the farmers and developing competitive value chains, increasing exports, establishing skilled jobs and contributing to economic development cotton clusters would make sure that cotton fibre is fully processed within the country (at least into yarns) and further integration of raw cotton production and textile industry would accelerate investments in the new textile-clothing capacity and create many permanent highly-paid decent jobs in textile, weaving, and clothing industries, replacing temporary (seasonal) jobs of manual cotton pickers.
3. **Clusters to reduce fiscal drain** – while bringing innovations and replacing the ineffective public services, the clusters would invest in updating soil maps and agronomic recommendations for cotton production based on the actual soil fertility and would increase soil fertility, including through better crop rotation. When farm profits increase, the GoU would be able to phase out input and other subsidies. Moreover, clusters would invest in mechanization and water saving, which would further reduce the burden on public finance. The discipline in using public funds would bring more impact and results for the cotton sector. An accelerated introduction of market mechanisms would increase the purchasing power of farmers. That would allow phasing out energy subsidies (diesel and fertilizers), and encourage private local and foreign investments in energy, chemical, and water sectors.
4. **Clusters to increase farm profits** – an important competitive advantage offered by the cotton clusters to textile industries is guaranteed access to high-quality cotton fibre. Predictability of cotton fibre prices helps in accurately predicting supply and profits. Clusters will replace inefficient and unpredictable intermediary between textile enterprises and farmers, increase the yield and quality of raw cotton, providing “their” farmers with advisory services on modern farming and production methods. This all is anticipated increase the income of farmers.
5. **Clusters to increase investments** – the spinning industry (the first stage of the processing of cotton fibre) generates a $690 value added and a $570/ton of cotton fibre profit (plus another USD 75/ton due to more efficient cotton cleaning), while farmers on average get only USD 100-200/ha. An expected profit of the spinning industry alone (with full processing into yarn) is at least USD 510 million annually (with the processing of 900,000 tons of cotton fibre), which is an important source of investment and tax revenue. The GoU intends to force clusters to reinvest part of their profits from textile production in agriculture, including in water-saving technologies and cotton ginning.
6. **Clusters aim to solve problems with forced labour and child labour** – cotton clusters are expected to accelerate the introduction of mechanized cotton harvesting, setting market/attractive prices for cotton picking, creating decent working conditions to increase pickers’ productivity and have a greater control over the labour in the cotton farming. This, alongside other important labour management measures, would contribute to the resolution of the problem of child labour and forced labour, which seriously harms not only the image of the country and closes the markets in the developed countries for textile products but is also a heavy burden for many organisations and people in the country, who are engaged in picking cotton.

5.2.2.5 Initial Assessment of Cotton Clusters

The World Bank Agricultural Team with support and participation from the ILO Third-Party Monitoring Project has conducted an initial assessment of cotton clusters, as these are seen as a possible solution to the forced labour issue in the cotton sector of Uzbekistan. The findings of this assessment are summarised in Table 5.6 below with a link to the Project performance and anticipated results.

Table 5.6: Mott MacDonald analysis of the Project performance based on initial WB/ILO assessment of cotton clusters in Uzbekistan

WB/ILO category potential outcomes	Project performance in 2019	Conclusions on outcomes (positive/negative)
Employment	By 2020 the FE "Indorama Agro" LLC cluster generated 2,720 permanent jobs in Kashkadarya and Syrdarya regions, including 15 jobs in Tashkent 394 cotton farms are contracted by the Company in Kasbi district. These cotton farms currently employ 1,299 farm workers. 420 people will be engaged at the new ginning facilities in Kasbi and Sardoba districts and 10 people will be recruited to operate and maintain two residential complexes in Karshi and Gulistan in 2020.	Positive
Receipt of inputs	Contract farming is launched in Kasbi district only. FE "Indorama Agro" LLC is managing input supplies (seeds, fertilizers, plant protection products, diesel, etc.) of all 394 contracted farms so that the farmers may concentrate directly on farming. FE "Indorama Agro" LLC is the only cotton cluster in Uzbekistan that operates outside of the government support and quota system. Contracted farmers agree with the Company raw cotton supply plans via supply contracts. No penalties are imposed by the Company on farmers who did not manage to meet their plans.	Positive
Utilisation of abandoned land	FE "Indorama Agro" LLC acquired 2,538 ha of poor land (or 9% of total land allocated) in Kashkadarya region and 1,656 ha of poor land (or 6% of total land allocated) in Syrdarya region. The capacity of land reallocated to FE "Indorama Agro" LLC in Kashkadarya is evaluated to be of 50-60 ball-banitet and requires significant improvements before it may be used for cotton production. In 2019 only 5,500 ha were used for farming out of 13,088 ha allocated to FE "Indorama Agro" LLC in Kasbi and 5,200 ha (out of 14,549 ha) in Nishon.	Positive
Inflated soil fertility rate in official documents	This is a common issue the Project faced in the first year of operation when the cotton yield targets were not met in Kashkadarya branch impacted by the land fertility.	Negative
Land transition to a narrow circle of people	In the Project footprint 1068 cotton farms had to cease their operation as a result of land acquisition for the Project thus reducing the number of individual farms engaged in cotton farming. In 2020, more changes are anticipated if the government will take a decision to make cotton clusters the only form of operation in cotton farming.	Negative
Effective use of farm cooperation	The Company facilitated cooperation among local farmers: • Established agronomist support and consulting services with one agronomist monitoring 4 farmers daily and providing continuous advice to the contracted farmers in their respective Producer Units. • Training and workshops for all contracted and direct farmers to understand and introduce modern technologies and practices, raise awareness of child and forced labour issues and promote decent work principles in cotton farming	Positive
Incentives for efficient farmers to meet the forecasted yield	FE "Indorama Agro" LLC is sourcing the interest free funds to contract farmers for the upcoming crop season. The advance is upto 60% of the value of estimated harvested crop. Earlier, the Government was funding at 3% annual interest rate. Such incentives along with modern techniques applied in contract farming support growth of farmers' income, decrease of costs and growth of the farmers' business.	Positive
Continuation of state order plans	FE "Indorama Agro" LLC is the only cotton cluster in Uzbekistan that operates outside of the government support and quota system. Contracted farmers agree with the Company raw cotton supply plans via supply contracts. No penalties are imposed by the Company on farmers who did not manage to meet their plans.	Positive
Practice of using state purchase prices for cotton	FE "Indorama Agro" LLC as most of the clusters, sets out a price premium for contract farmers who exceeded the plan. At the same time the state price for cotton is not tied to the world market and is low.	Positive

WB/ILO category potential outcomes	Project performance in 2019	Conclusions on outcomes (positive/negative)
Regional monopolization:	FE “Indorama Agro” LLC is competing with other six clusters operating in the Project regions. The Company is a responsible agricultural investor following internationally accepted rules of community engagement, sharing benefits and treating local farmers fairly via training, transfer of know-how, pre-financing, free-of charge agronomist support, higher purchase prices, support with harvesting).	Positive
Application of water saving technologies	FE “Indorama Agro” LLC is reducing water losses and consumption (rehabilitation of the irrigation systems, replacing pipelines, using laser levelling and deep ploughing).	Positive
Limited introduction of water saving technologies	The Project is using the existing irrigation and drainage infrastructure and will rehabilitate concrete canals, irrigation flumes, water pipes, wells, pumps and water access points along the main canals as well as collectors, open drainage ditches and underground pipes to reduce water losses and introduce water saving technologies.	Positive
Improved seed production	In 2019 the Company launched the Cotton Breeding Programme for a period of eight years with the objectives to *inter alia* increase cotton fibre yields, improve cotton fibre quality. Better seeds were supplied to contract farmers to improve production.	Positive
Poor seed quality, low quality of services	FE “Indorama Agro” LLC is paying great attention to selection and preservation of seed varieties as a part of the Cotton Breeding Programme launched in 2019 to improve seeds quality and influence yields. Different state organisations and/or state-owned enterprises provide services to cotton clusters and farmers at inflated tariffs, of poor quality, or sometimes even do not provide services at all, but regularly receive payment.	Positive
Yield increase	FE “Indorama Agro” LLC managed to increase cotton yields by almost by three times in the first year of operation (2019) from 1.2 t/ha up to 3 t/ha (Sardoba district example). The Project is targeting at 5 t/ha of cotton.	Positive
Investments in agricultural machinery and equipment	FE “Indorama Agro” LLC has procured modern machinery and equipment to automize and mechanise key farming operations, including harvesting associated with high risk of child and forced labour. The first harvesting in 2019 was completely mechanised and completed in one run, including harvesting at contract farmers. The Company will purchase more machinery next year. Seasonal workers, especially women, will lose job opportunities through mechanisation	Positive and negative
Organisation of cotton picking and prevention of forced labour and child labour risks	During the first year of operation, FE “Indorama Agro” LLC was organising cotton picking itself (at contract farmers) under strict internal monitoring without using forced labour and will gradually move to mechanized cotton harvesting in all operations when all machinery is procured.	Positive
Increased ginning efficiency	Two modern ginning facilities utilising US technology will start operation in 2020 in Kasbi and Sardoba districts with 210 people manpower requirements for each gin.	Positive
Increasing the share of cotton processing	Increasing the share of cotton processing: 100% of cotton harvested by FE “Indorama Agro” LLC and 100% of cotton supplied by contract farmers to FE “Indorama Agro” LLC will be processed at the spinning facility in Kokand to produce cotton yarn.	Positive

WB/ILO category potential outcomes	Project performance in 2019	Conclusions on outcomes (positive/negative)
Loss of concentration	Indorama is planning to start silk production, grain processing and improve logistics in the AoI with all these plans remaining within the main area of the cluster's specialisation and manageable and thus may be considered as a positive outcome in the future when these new operations will generate employment for local communities and seasonal workers.	Positive
Concerns of textile enterprises that do not organise clusters	In general, clusters may restrict access to cotton fibre for other small textile companies. Moreover, clusters will be monopolizing other cotton products (cotton oil, seeds, lint (for paper industry), oil meal and husk as animal feed.	Negative
Losing dynamism in the long run	In general, the clusters demonstrate a success due to currently available "reserves for growth" and the use of simple solutions. The marketing of end-use products in the textile industry would require attention and efforts.	Positive
Unclear legal status of cotton clusters: This is a common issue for the cotton clusters in Uzbekistan that is also affecting the Company	The rights and obligations of cotton clusters are only governed in general terms. The clusters interaction with Government, farmers and other interested parties, and the duration of cluster is not fully determined.	Negative
Issues of land and property are not fully resolved:	This is a common issue affecting all cotton clusters and the Project. Under the law, agricultural land is in the state ownership. Although the land is transferred to farmers for long-term lease through open tenders, the lease conditions are aimed at maintaining the state order system for cotton and grain. Moreover, there is no individual law to guide land acquisition by cotton clusters leading to insecurity of farmers' land rights and unclear compensation requirements should farmers' land leases be terminated because of the clusters.	Negative
Frequent changes in legislation	Frequent changes in legislation and reforming period place a regulatory burden on cotton clusters and more initiatives are required to promote development of competition.	Negative
Institutional change	FE "Indorama Agro" LLC supports the expansion of market mechanisms. The Company defends the interests of farmers, demanding compliance with decent work principles, provision of quality services, making payments on time, providing free loans, etc. Indorama sells end cotton products exclusively through formal market channels and thus participates in establishing formal and open markets.	Positive
Reduced transition costs and increased predictability	FE "Indorama Agro" LLC is growing crop of high-quality fibre to satisfy own need in the raw material and will not be subject to any manipulation in buying fibre from third parties.	Positive
Local authorities intervene in the activities of cotton clusters:	District Hokimiyats do not place orders (quotas) for cotton and grain produced by FE "Indorama Agro" LLC cluster any more as the Company operates outside the Government quotas system. Moreover, the Company thoroughly monitors all contract farmers and the recruitment of cotton pickers excluding Hokimiyats from cotton pickers mobilisation.	Positive
Result orientation	Result orientation: Remote and poor land was allocated to FE "Indorama Agro" LLC cluster with significant investments required in rehabilitation of land and irrigation systems. This affected the area of cotton production, specifically in Kashkadarya region where only 42-36% of acquired land could be used for farming in 2019.	Positive
Negative impact of the state regulation for wheat on farmers' profits	FE "Indorama Agro" LLC's cluster is operating out of the state order targets on wheat production although the Project may produce wheat for rotation and for economic reasons. The cluster will be able to sell wheat at market prices to any buyer. However, the contracted farmers are subject to the wheat state order as they are selling wheat to the government while only cotton is supplied to the Company.	Negative

WB/ILO category potential outcomes	Project performance in 2019	Conclusions on outcomes (positive/negative)
Reduction in subsidies	FE “Indorama Agro” LLC is not attracting advance loans for cotton production and picking using own resources and thus reducing the level of subsidies in cotton farming.	Positive
Lack of access to high-quality domestic mineral fertilizers	FE “Indorama Agro” LLC cluster is importing fertilizers from Kazakhstan due to lack of good quality fertilizers in Uzbekistan using own funds and thus avoiding restrictions on imports when government funds are used. Imported fertilizers are used by the cluster and distributed among contracted farms in Kasbi to improve cotton yields.	Positive
Attracting foreign investments	The Company is applying for international investments from International Financial Organisations (the EBRD and IFC) to finance Project investments and working capital due to difficulties of working with domestic banks in Uzbekistan	Positive
Difficulty in attracting domestic bank financing for capital investments	Difficulties of attracting domestic financing in Uzbekistan make borrowing from international financial organisations or banks a preferred option for the Company.	Neither

Source: Third Party Monitoring of Child Labour and Forced Labour during the 2018 Cotton Harvest in Uzbekistan, ILO, April 2019 and FE “Indorama Agro” LLC

These initial assessment results will be considered in the Project assessment and mitigation will be proposed to reduce negative social impacts and risks associated with the Project.

5.2.3 Current Land Status and Use in the Project AoI

5.2.3.1 History of Farms Restructuring in Uzbekistan

According to the RoU Land Code agricultural land is in state ownership. Land is granted to farms based on a Land Lease Agreement and sub-leasing is not permitted. The land use pattern in Uzbekistan's agriculture is now structured around three main categories of producers: individual farms, dekhkan farms (refer to Table 5.8 for definitions) and agricultural enterprises. These evolved as a result of the farm restructuring process that since 1991 to 2019 includes five critical stages summarised in Table 5.7 below.

Table 5.7: Farms restructuring stages in Uzbekistan

Process	Stage I (1992-1997) De-collectivisation of state farms	Stage II (1998-2002) Partial fragmentation	Stage III (2003-2008) Complete fragmentation	Stage IV (2008/09-2015) Farm consolidation	Stage V (2016-present) Production specialisation
Main transformation process	Transformation of sovkhozes into kolkhozes	Transformation of kolkhozes into shirkats. Land lease to individual farms	Complete transformation of shirkats into individual farms	Farm reconsolidation (farm-size optimization)	Fragmentation and optimisation of production
Dominant farm types	Kolkhozes, sovkhozes	Shirkats, individual farms	Shirkats, individual farms	Individual farms, mainly cotton-grain producers	Individual farms of different specialisation
Main policy objectives	Expansion of wheat areas and yields, reorganisation of state farms	Specialisation of newly established individual farms	Development of non-cotton/wheat producing sectors and livestock farms	Increased and stable cotton yields, relocation of cotton fields	Relocation of cotton and wheat fields, increased area of high value crops, multi-profile farms

Source: Sergiy Zorya. Farm Restructuring in Uzbekistan: How Did It Go and What is Next?

Although both being treated as private, there are clear differences in the definitions of individual and dekhkan farms. These definitions are summarised in the table below.

Table 5.8: Definition of individual and private farms in Uzbekistan

Parameter	Individual Farm (farmer hajaligl)	Dekhkan Farm (dekhkan hajaligi)
Basic definition	Individual commercial farm organized as a legal entity operating leased land	Small-scale family-based farm, based on household plot operation
Utilised labour	Family members, as well as permanent and seasonal workers	Mainly family members, with option to hire seasonal workers
Land tenure	Long-term land lease (up to 50 years). The land lease duration depends on the fulfilment of state procurement target. Farm size can vary with respect to production specialization	Lifetime inheritable possession. Sizes of allocated land: 0.35 ha for irrigated land; 0.5 for rainfed land. This includes also area for buildings
Ownership	Any adult person with sufficient agricultural qualification	Former workers of agricultural enterprises, rural families
Production specialisation	Only agricultural produce indicated in land lease contract. Mainly cotton and wheat	Any agricultural produce, mainly wheat, vegetables, fruits, livestock

Source: Farm Restructuring in Uzbekistan: How Did It Go and What is Nest? January 2019

Agricultural enterprises have evolved from collective and state farms to agricultural cooperatives (shirtkats) and further restructured to specialised enterprises of different forms including export-oriented producers or large poultry farms which are registered as an enterprise. This category also includes "agri-firms" established since 2006 particularly in the horticultural sector. Agri-firms are non-government associations and private firms as well as processing companies that also operate farm land.

Restructuring measures for the fifth stage will involve gradual reduction of the total sown areas and attempts to expand and diversify agricultural production, although cotton and wheat will remain strategic crops. Land freed up from cotton and wheat is planned to be allocated for potato, fodder crops, intensive gardens, oilseeds

and other crops. By 2020, the plan is to increase vegetables and potato production area by 40%, while the area under oilseeds is projected to double.

The projected decrease in cotton and wheat area is planned to be compensated by respective increase in their yields. As such it is projected that by 2020 the increase in cotton yield should be about 3%, while wheat yield should increase by 20% thus off-setting the projected decrease in wheat area and bring additional 16% of output.

Restructuring will also target the increased number of livestock and production output, and the number of livestock farms. Among the regions, Syrdarya region is projected to have one of the highest increases in the number of cattle heads by 2020 (i.e., 40%).

The Company's cotton seed breeding programme is likely to facilitate the country's agricultural targets of increasing cotton yields and reducing cotton sown areas for sector diversification with no major change in land use within the Project footprint.

5.2.3.2 Land Optimisation Process in Uzbekistan

In the farms restructuring process the GoU completed two land optimisation processes in 2015 and 2016 and initiated a new one starting in January 2019. The 2015 land optimisation[21] process targeted consolidation of farms. The process initiated in 2016[22] reduced the size of individual farms so that the maximum farm size would not exceed 70 to 90 ha, depending on the region.

The new optimisation process initiated by the Governments in 2019[23] is based on the new rules establishing minimum size of individual farms and agricultural enterprises as detailed in the table below.

Table 5.9: New individual farm requirements

Type of individual farm	Minimum size starting from 2019
Cotton and wheat farming	100 ha
Cereals and vegetable farming	20 ha
Horticultures and vinicultures	10 ha
Melon growing	5 ha

Source: Decree of the Cabinet of Ministers No.14 of 09.01.2019

The key reasons for this recent optimization are (as describe in the Decree) illegal land use of farm land and squatters.

Frequent farm restructuring and recent land optimisation processes weakened farms and reduced their capacities in efficient management. Moreover, majority of farmers are now facing financial pressure and lack of machinery and these make it difficult to run even smaller farms of 15-20 ha.

The farms optimisation process in Uzbekistan overlapped with the Project land acquisition process and this was an additional reason for farmers to give up their land lease knowing they could not meet the new requirements regarding the size of a cotton farm and its performance.

5.2.3.3 Previous Land Use and Tenure

Land parcels acquired in Phase I were previously leased by individual farms over a lease period of 49 years in all Project districts. Individual farms in Uzbekistan are treated as legal entities. The farm is required to be formally registered and have a long-term Land Lease Agreement with a respective district hokimiyat. As a legal entity a farm shall open and maintain bank account(s) and have a seal with the name of the farm. The farm shall operate based on its Charter, describing *inter alia* specialisation and key operations of the farm. The farm may recruit workers and is responsible for paying their salaries and taxes. The founder of the farm acts as the

[21] Decree of the Cabinet of Ministers No.362 of 15.12.2015 "On Measures for Optimising the Size of Land Plots Being Allocated to Farms"

[22] Decree of the Cabinet of Ministers No.34 of 10.02.2016 to amend Decree of the Cabinet of Ministers No.362 of 15.12.2015 "On Measures for Optimising the Size of Land Plots Being Allocated to Farms"

[23] Decree of the Cabinet of Ministers No.14 of 09.01.2019

Farm Manager and any citizen beyond 18 years old may be a farmer if he/she has a qualification or experience in agricultural sector.

Before the Project 2,897 cotton farms operated in the local AoI (Table 5.10). An average cotton farm in Kashkadarya region used to be 30-40 ha with 3-4 workers employed by the farm (one worker per each 10 ha) and 20-30 ha with 2-3 workers in the farm in Syrdarya region.

Table 5.10: Total number of farms in the local AoI before the Project, 2018

Region	District	Total Farms	Cotton Farms	Other Farms
Kashkadarya	Kasbi district	1,358	1,019	339
	Nishon district	1,278	904	374
Syrdarya	Sardoba district	833	578	255
	Oqoltyn district	772	396	376
Total		**4,241**	**2,897**	**1,344**

Source: Kasbi District Hokimiyat, Nishon District Hokimiyat, Sardoba District Hokimiyat, Oqoltyn District Hokimiyat, December 2019

Private farms also operated in the Project Area of Influence, known as dekhkan[24] farms. These private farms are small-scale (0.35-0.5 ha) family-based farms involving household plot operation. Dekhkan farms are lifetime inheritable possession of former workers of agricultural enterprises or rural families (refer to Sub-section 5.2.3 for more detail). Dekhkan farms are not involved in cotton production and specialise mainly in wheat, vegetables, fruits and livestock farming and gardening. No information is available on the exact number of dekhkan farms in the Project footprint prior to FE “Indorama Agro” LLC started operations.

All cotton farms had LLAs concluded with the respective district hokimiyats, which were drawn up based on the LLA Template approved by Annex 7 to Decree of the RoU Cabinet of Ministers No.476 of 30.10.2003 "On Measures to Implement the Farms Development Concept for 2004-2006". The farms paid a land lease fee charged as the land tax.

LLAs clearly stipulated termination provision in Clauses 17 and 20. These included:

- Voluntary decision of the Lease Holder (the farm) to terminate the right to lease the land plot by a three months written notice describing the reasons of termination
- Expropriation of the land plot (or part of the land plot) by the Landlord (district hokimiyat) for state or public needs.

5.2.3.4 Farms Currently Operating in the Project AoI

Information provided by the District Hokimiyats during the ESIA consultation process and data collected and reviewed by the impact assessment study indicate a drastic reduction in the number of farms, especially cotton farms in the Project AoI and in wider Uzbekistan as a result of the agriculture sector reforming, cluster operations and continuous land optimization process of the farms restructuring.

Table 5.11: Total number of farms in the local AoI after the Project, 2019

Region	District	Total Farms		Cotton Farms		Other Farms	
		2018	2019	2018	2019	2018	2019
Kashkadarya	Kasbi district	1,358	491	1019	402	339	89
	Nishon district	1,278	610	904	439	374	171
Syrdarya	Sardoba district	833	641	578	396	255	255*
	Oqoltyn district	772	369	396	259	376	110
Total		**4,241**	**2, 111**	**2,897**	**1,496**	**1,344**	**625**

Source: Kasbi District Hokimiyat, Nishon District Hokimiyat, Sardoba District Hokimiyat, Oqoltyn District Hokimiyat, December 2019
* Estimated
** Including dekhkan farms

[24] A dekhkan farm is a private small-scale family-based farm in lifetime inheritable possession of former workers of agricultural enterprises or rural families based on household plot operation mainly by family members with option to hire seasonal workers to farm mainly wheat, vegetables, fruits and livestock.

The farms currently operating in the Project AoI have LLAs with the District Hokimiyats for period of 49 years, including contracted farms in Kasbi district. Each farm employs permanent workers so that one worker is managing 10 ha of land. Starting from January 2019, cotton farms may not be less than 100 ha, meaning that an average cotton farm in the AoI employs at least 10 permanent workers.

No precise information is available of the number of dekhkan (family-based) farms currently operating in the Project AoI. Based on information provided, there are about 1,000 dekhkan farms operation in Nishon district and 15 dekhkan farms in Sardoba district. There key farming specialisation include growing vegetables, fruits, melons and gardening.

No dekhkan farms are currently affected by the Project. Only few dekhkan farms were impacted by the land re-allocation process led by the Nishon District Hokimiyat in 2018. According to information provided by the Nishon District Hokimiyat all these affected dekhkan farms were granted other land plots in replacement of the parcels allocated to the Project.

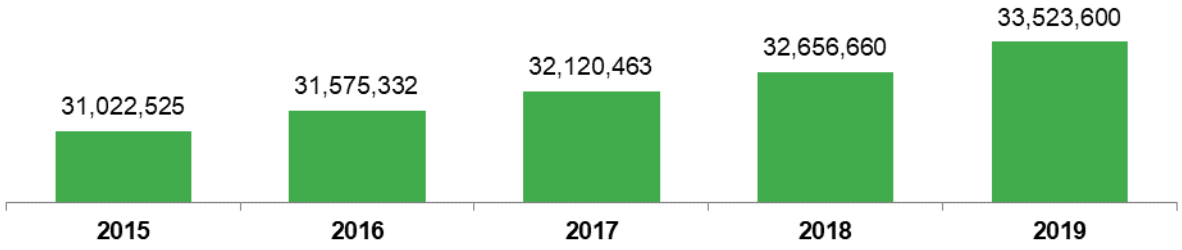
5.2.4 Demography

5.2.4.1 Country-wide and Regional Context

As of July 1, 2019, the resident population in Uzbekistan totalled at 33,523,600 people and increased by 0.8% from the beginning of 2019 demonstrating steady growth by 7.5% over a period of recent five years. This trend is mainly due to natural population growth only as migration balance has remained negative over recent the past 20 years. The country-wide difference between urban and rural population is negligible with the rural population of 49.5% (or 16,584,000 people).

At a regional level, the population totals at 3,214,090 in Kashkadarya region and 829,905 people in Syrdarya region. The local AoI is home to 340,406 people in Nishon and Kasbi districts and 115,630 in Oqoltyn and Sardoba districts (Table 5.12 below).

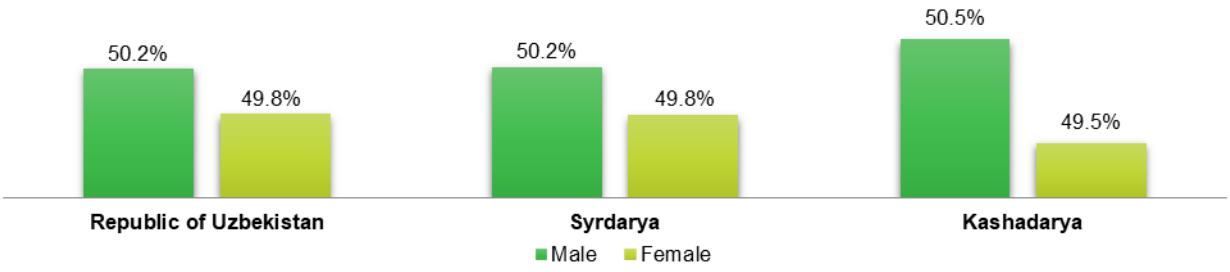
Chart 5.1: Resident population of Uzbekistan (July 2019), people



Source: https://stat.uz/en/open-data

Nationally, 49.8% of the population is female and 50.2% is male. The gender ratio of the total population in Uzbekistan is described as 1,000 males per 992 females. Similar ratios apply in Syrdarya and Kashkadarya regions as depicted in the chart below.

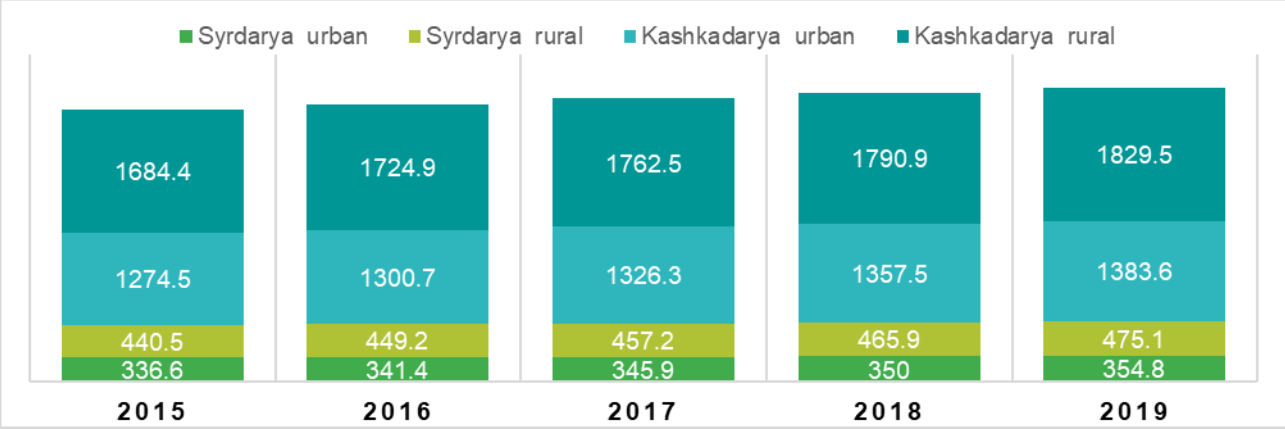
Chart 5.2: Resident population by gender in the wider AoI (2019), %



Source: https://gender.stat.uz/ru/

According to national statistics, the rural population in Syrdarya and Kashkadarya regions makes up 57% or 354,800 and 1,829,500 people respectively (as of 1st January 2019) as the regions are historically engaged in farming cotton and other crops as well as livestock production.

Chart 5.3: Urban and rural population in the Project regions, '000 people



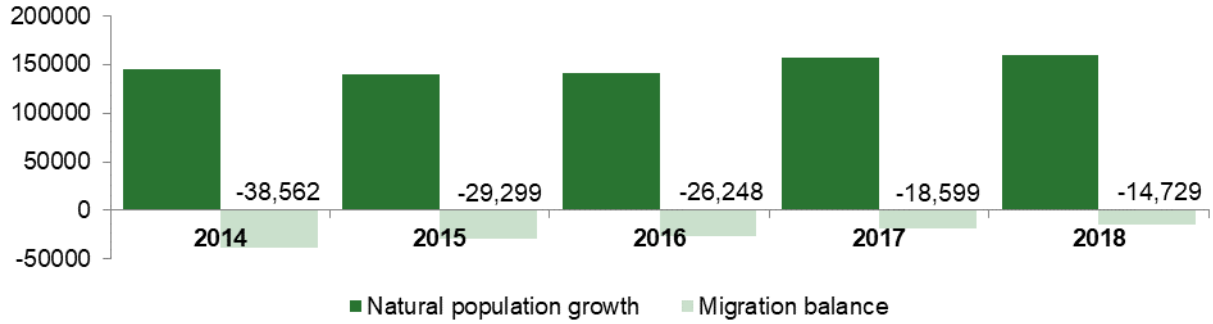
Source: https://stat.uz/en/open-data

The general trend demonstrates slow but steady growth in the share of rural population in both regions over the period of four years between 2015 and 2019 (by 0.5% in Syrdarya region and 0.1% in Kashkadarya region) and is driven by the natural population growth and relatively high birth rates (26 and 22 per 1,000 population against, for instance, 18 in the city of Tashkent or 21 in Tashkent region).

Since 1991 there has been a two-way flow of population dramatically changing the country's demographics. Thousands of ethnic Uzbeks who had been working outside of the country have been returning to Uzbekistan from Russia and other neighbouring countries, other minorities such as the Russians, Crimean Tatars and others have also been emigrating in large numbers.

Nationally, a majority of migrating population leaves for Kazakhstan (56% of total departed) and Russia (37% of total departed) to find work or permanent residency (as of June 2019) thus keeping the migration balance negative for over twenty years. However negative migration has dropped over recent years by 38% against 2014.

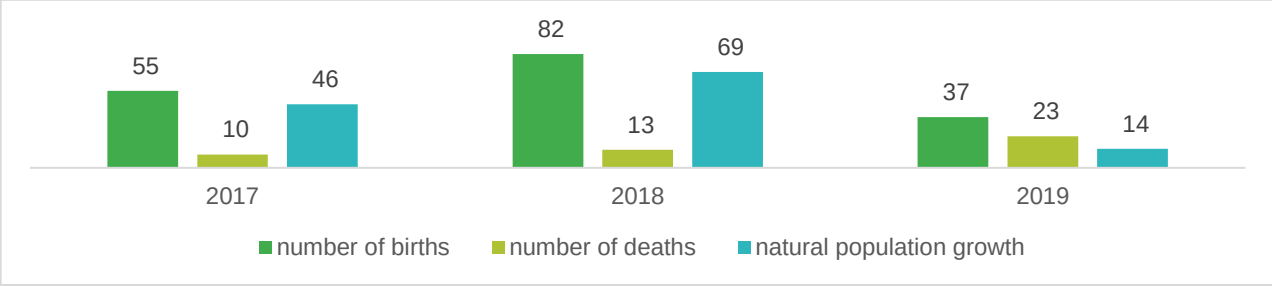
Chart 5.4: National migration



Source: https://stat.uz/en/open-data

A higher negative migration compared to other parts of Uzbekistan is noticed in Kashkadarya region. The region is more urbanized than, for example Syrdarya region, has developed industries and natural resources. Population growth rates are relatively high however available local jobs are not meeting the growing demand of the workforce and the working age population is migrating from the region and Uzbekistan. The loss of population as a result of migration is however, compensated by relatively high natural population growth (Chart 5.5).

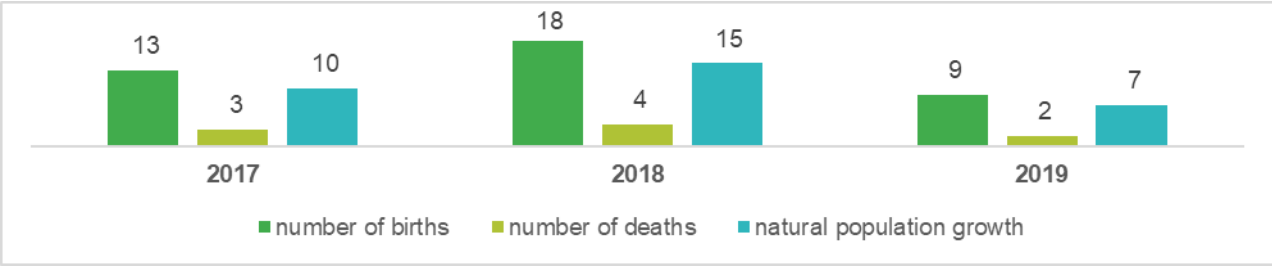
Chart 5.5: Natural population growth in Kashkadarya region, '000 people



Source: https://stat.uz/en/open-data

Similar trend in population growth is notices for Syrdarya region with natural growth remaining positive but dropping while still contributing to the overall increase in population of the region (Chart 5.6). Syrdarya is a rural region with lower incomes and seasonal jobs. In sourcing incomes, the rural population migrates to other regions of Uzbekistan (mostly Tashkent) or to Russian and Kazakhstan with no visas required and possibilities to earn higher incomes compared to Uzbekistan. However, disturbance to the habitual way of life in the families associated with the long absence of a husband (or one of the spouses) who migrated to work outside their permanent place of residence, results in higher responsibilities and concerns of women for their children and do not stimulate reproductive processes. In addition, labour migration objectively leads to a decrease in the number of marriages and impacts birth rates.

Chart 5.6: Natural population growth in Syrdarya region, '000 people



Source: https://stat.uz/en/open-data

5.2.4.2 Local and Community Context

As indicated in the table below, historically the largest gap (of 1%) between male and female population in the Project area is in Kasbi district with prevailing male population.

Table 5.12: Resident population by gender in the local AoI (2019), '000 people

Location	Total, '000 people	Female Population, '000 people (% of total)
Syrdarya region	**829.9**	**413.2 (49.8%)**
Oqoltyn district	50.9	25.3 (49.7)
Sardoba district	64.7	31.9 (49.3)
Kashkadarya region	**3213.1**	**1589.2 (49.5%)**
Nishon district	148.6	74.2 (49.9%)
Kasbi district	191.6	93.9 (49.0%)

Source: https://stat.uz/en/open-data

Approximately 133, 027 people live within the ACs, including over 44,000 people in Kasbi district, almost 46,000 in Nishon district, 24,000 people in Oqoltyn and approximately 18,900 people in Sardoba (Table 5.13).

Table 5.13: Population in the ACs, July 2019

District	Sub-district	ACs	Number of Households	Population	Gender Ratio (%)	
					Male	Female
Kasbi	Hujaqulov	Kamashi QFY	956	6,769	50%	50%
		Nurobod MFY	634	3,625	n/d	n/d
		Khujaki MFY	754	4,471	n/d	n/d
		Mushqoqi MFY	564	2,964	n/d	n/d
	Navruz	Nazartepa MFY	966	5,270	53%	47%
	Pakhtakor	Pakhtakor QFY	583	4,984	n/d	n/d
		Fazli MFY	533	5,164	51%	49%
		Jarkucha MFY	521	3,732	n/d	n/d
	Beruniy	Chulquvar QFY	512	3,299	53%	47%
		Denov	530	3,908	51%	49%
	Sub-total Kasbi		*6,553*	*44,186*		
Nishon	Nurli Kelajak	Qirqquloch QFY	649	4,840	51%	49%
	Uch Mula	Yangiobod MFY	671	4,150	49%	51%
	Shirinobod	Shirinobod MFY	1,008	6,245	50%	50%
	Oydin	Kaptarli MFY	964	6,829	n/d	n/d
	A. Qodiriy	A.Qodiriy MFY	964	6,403	49%	51%
	Khamza	Istiqbol MFY	523	2,147	50%	50%
	Guliston	Balkhiyak MFY	1,124	3,743	49%	51%
		Katta Ankhor		2,601	n/d	n/d
	Turkmenistan	Oydin MFY	1,048	4,941	n/d	n/d
	Samarqand	Kuksoy MFY	680	4,097	n/d	n/d
	Sub-total Nishon		*7,631*	*45,996*	n/d	n/d
Oqoltyn*	Sardoba	Dustlik MFY	773	3,032	n/d	n/d
		A.Navoiy MFY	694	2,836	n/d	n/d
	Musamukhammedov	Sakhovat MFY	634	3,469	n/d	n/d
	Uqubayev	Kurkam Diyor MFY	858	4,060	n/d	n/d
	Z.M.Bobur	Ahillik MFY	1,001	5,501	n/d	n/d
	Toirov	Shodlik MFY	840	5,091	n/d	n/d
	Sub-Total Oqoltyn		*4,800*	*23,989*	n/d	n/d
Sardoba*	T. Malik	Yurtdosh MFY	620	3,661	n/d	n/d
		Dustlik MFY	715	4,336	n/d	n/d
	G.Gulom	Qurg'ontepa MFY	530	3,806	n/d	n/d
	Sh.Rashidov	Birlik MFY	513	3,915	n/d	n/d
		Ota Yurt MFY	584	3,138	n/d	n/d
	Sub-total Sardoba		*2,962*	*18,856*	n/d	n/d
Total			**21,946**	**133,027**	49%	51%

Source: FE "Indorama Agro" LLC based on data sourced from mahallas

Denov community is also considered to be affected by the Project with 3,908 people living there (including 49% of women). Information on households in this community is not available now but estimated to be at least 530. It means that approximately 133,027 people will be directly affected by the Project footprint and the community is further included in the assessment.

Generally, the population of Uzbekistan is very young: 34% of people are aged under 14. The median age of population in Uzbekistan is 26.5 years in 2019 (to compare, the median age in 1991 was 23.3 years). According to international criteria, the population is considered old if the proportion of people aged 65 and older exceeds 7% of the total population. As of the start of 2019, the population aged 65 years and older in Uzbekistan makes up 4,6% of the total population in the country.

Most of the rural population in the local AoI (Table 5.14) have higher percentage of pensioners (up to 6%) than the average for the country (except for Sardoba district where population aged 65 and older accounts for 4.3%

of the total population in the district). In rural areas people live longer and the percentage of population aged 75+ is higher than in urban areas of Uzbekistan. Additionally, the minimum qualifying employment period for pensions in Uzbekistan is now 7 years (in Russia, Kyrgyzstan and Tajikistan 10 years, in Baltic states 15 years, in Belarus – 17 years) making it easier for people to qualify for pension allowances.

Table 5.14: Resident population in the local AoI, people (%)

Location	Population	Under working age		Working age		Over working age	
		Total	female	Total	female	Total	female
Syrdarya region	**829,905**	**254,144**	**122,634 (15%)**	**505,786**	**244,308 (29%)**	**69,975**	**46,223 (6%)**
Oqoltyn district	50,940	16,406	7,907 (16%)	30,795	14,804 (29%)	37,39	2,569 (5%)
Sardoba district	64,690	20,580	9,862 (15%)	39,780	19,235 (30%)	4,330	2,776 (4%)
Kashkadarya region	**3,213,090**	**1,040,762**	**502,762 (16%)**	**1,897,717**	**912,401 (28%)**	**27,4611**	**173,996 (5%)**
Nishon district	180,089	48,935	29,028 (16%)	115,329	54,561 (30%)	15,825	10,344 (6%)
Kasbi district	160,317	60,616	23,638 (15%)	87,425	43,124 (27%)	12,276	7,470 (5%)

Source: https://stat.uz/en/open-data

Based on the demographic analysis of the local AoI we may expect similar trends in the ACs with the elderly making up 4% to 6% of total population in their respective communities.

5.2.5 Ethnicity, Indigenous Peoples, Religion and Language

Ethnicity

Uzbekistan is made up of a number of traditional populations of Turkic (Uzbeks, Kazakhs, Karakalpaks), Semitic (Bukhara Jews) and Iranian origins (Tajiks) as well as more recent minorities which arrived in the country during the Russian and Soviet domination (Russians, Crimean Tatars, Meskhetian Turks, Koreans and some Ashkenazi Jews).

The Autonomous Republic of Karakalpakstan occupies 37% of the country's territory and ethnic Karakalpaks represent about a third of the Karakalpakstan's population, and a very slight proportion of the country's total population (2.2%).

The ethnic Tajik population is widely thought to be much greater than official statistics indicate, given that many Tajiks and Tajik speakers may classify themselves as Uzbeks to improve their career opportunities.

The largest ethnic group in Uzbekistan are Uzbeks. The last census was conducted in 1989, but according to official estimates updated in 2017, the ethnic Uzbek majority totalled just over 26.9 million (83.8% of the population) while ethnic Tajiks made up 1,544,700 (4.8%).

According to national statistics there have been changes in the ethnic structure of the population since 1991. The share of Uzbeks increased by 11% and now accounts for 84% with the noticeable drop in the share of Russians (by 5.4%), Kazakh (by 1.6%), Tatars (by 1.4%) and Ukrainians (by 0.5%) between 1991 and 2017 (Table 5.15).

Table 5.15: Ethnicity in Uzbekistan, % of total population

Ethnicity	1991	2017	Ethnicity	1991	2017
Uzbeks	72.8	83.8	Tatars	2.0	0.6
Karakalpaks	2.1	2.2	Turkmens	0.6	0.6
Tajik	4.8	4.8	Koreans	0.9	0.6
Kazakhs	4.1	2.5	Ukrainians	0.7	0.2
Russians	7.7	2.3	Others	3.4	1.5
Kyrgyz	0.9	0.9			

Source: https://stat.uz/en/open-data

The majority of population within the wider AoI in Syrdarya and Kashkadarya regions are ethnic Uzbeks (79%-93%). Within the local AoI the Uzbek population varies between 76% (Sardoba district) and 95% (Nishon district). Ethnic minorities are Karakalpaks, Koreans, Turkmen, Tatars, Azerbaijanis, Ukrainians, Russians and Kazakhs. Interviews with local mahallas confirmed that there are no ethnic conflicts nor social unrest or tension in the local communities, people live in peace and respect each other's religions and there are inter-ethnic marriages in the ACs.

Table 5.16: Ethnic profile of the local AoI (January 2019), % of the total population

Location	Uzbeks	Karakalpaks	Russians	Ukrainians	Belarusians	Kazakhs	Azerbaijanis	Kyrgyz	Tajiks	Turkmens	Tatars	Koreans	Other
Syrdarya Region	**79%**	**0.02%**	**2.8%**	**0.1%**	**0.05%**	**1.6%**	**0.3%**	**2.1%**	**9.3%**	**0.1%**	**0.7%**	**1.0%**	**3.2%**
Oqoltyn district*	96.8%	0.00%	0.3%	0.01%	0.00%	0.19%	0.03%	0.7%	1.03%	0.01%	0.7%	0.1%	0.16%
Sardoba district	76%	0.00%	1.1%	0.1%	0.02%	0.7%	0.1%	18.4%	1.7%	0.03%	0.4%	0.3%	1.4%
Kashkadarya region	**93%**	**0.01%**	**0.6%**	**0.1%**	**0.03%**	**0.1%**	**0.1%**	**0.0%**	**4.0%**	**1.1%**	**0.3%**	**0.0%**	**0.8%**
Nishon district	94%	0.01%	0.1%	0.02%	0.003%	0.005%	0.01%	0.001%	5.4%	0.1%	0.03%	0.000%	0.3%
Kasbi district	93%	0.01%	0.3%	0.1%	0.02%	0.1%	0.1%	0.0%	5.0%	0.7%	0.3%	0.0%	0.3%

Source: https://stat.uz/en/open-data

*Data for Oqoltyn district as of 01.04.2019 provided by Oqoltyn District Hokimiyat

The largest ethnic minority in Sardoba district are the Kyrgyz who historically have large representation in Uzbekistan due to geographic proximity of the country and traditional engagement in irrigated agriculture (wheat, cotton) and cattle breeding (mainly sheep, houses and camels farming). The main areas of Kyrgyz minorities in Uzbekistan are Andijan, Namangan, Fergana, Syrdarya, Jizzakh and Tashkent regions.

Religion

Main religions in Uzbekistan are Sunni Islam, Orthodox Christianity, and Judaism. The national profile by confession includes Muslims — 79% (mostly Hanafi Sunni with Shi'a minority of 1%, mainly in Bukhara and Samarkand regions), Orthodox — 4% (the share of Orthodox Christianity is shrinking due to emigration of Russians, Ukrainians, Belarusians, etc.), 3% are non-Orthodox Christians (including Roman Catholics, Korean Christians, Baptists, Lutherans, Seventh-Day Adventists, Evangelical Christians and Pentecostals, Jehovah's Witnesses), as well as Buddhists, Baha'is, Krishnaists, and remaining are atheists. And the rest are atheists.

Table 5.17: Faith-based organisations in Uzbekistan

Faith-based communities	Islamic	Orthodox	Other confessions
Faith-based organisations	2050	158	17
Sunday schools	10	2	0

Source: https://stat.uz/en/open-data

There are 2,225 faith-based organisations and 12 Sunday schools operating in Uzbekistan.

Language

The national language of Uzbekistan is Uzbek. The second significant language is Russian which is widely known and used throughout the country. Residents in urban communities are much more fluent in Russian than people living in rural areas. Even though Russian has no official status in the country, many official documents, reports, etc. are published or duplicated in this language, and it is widely used in all spheres of life. Russian language training is compulsory, and it is studied in schools starting from the second year. A system of government-financed Russian-language education institutions (including higher education) is still existent and functioning in Uzbekistan. Multiple newspapers and magazines are published in Russian language, and 836 schools (2019) are educating in Russian language.

Besides Uzbek which has the status of official language in the whole country, several regions also use other languages. The Autonomous Republic of Karakalpakstan has Karakalpak as its second official language. Soh District in Fergana region is surrounded by territories of the Kyrgyz Republic, and 99.4% of its population (about 58,000 people) are ethnic Tajiks. Local schools (24), lyceums (2) and colleges (2) provide education in Tajik. Tajik-language media, schools, colleges and university departments also operate in Surkhandarya, Samarkand, Bukhara, Namangan regions, and few other locations populated with Tajiks. Tashkent and Navoiy regions and the Republic of Karakalpakstan have schools and university departments providing education in Kazakh language. Turkmen-language schools are in Khorezm region and the Republic Karakalpakstan.

In the local AoI the majority of the population speaks Uzbek. Ethnic minorities speak Kazakh, Russian, Karakalpak, Kyrgyz and Tajik and understand Uzbek.

Very few people in the ACs in Kasbi and Nishon districts speak or understand Russian. More people speak Russian in Sardoba and Oqoltyn districts. FGDs with the direct farmers and contracted farms as well as local communities identified that 83-97% of respondents (and 100% in Nishon district) are Uzbeks. Minorities (Tajiks, Kyrgyz and Tatars) also speak Uzbek. Based on this, disclosure of Project information is recommended to be in Uzbek for both the leaflets/printouts and verbal presentations.

Indigenous Peoples

EBRD PR7 and IFC PS7 both use the term “Indigenous Peoples” (**IP**) in a wider sense to refer to a distinct social and cultural group. This applies to communities or groups of Indigenous Peoples who maintain a collective attachment, i.e., whose identity as a group or community is linked, to distinct habitats or ancestral territories and the natural resources therein. It may also apply to communities or groups that have lost collective attachment to distinct habitats or ancestral territories in the Project area, occurring within the concerned group members’ lifetime, because of forced severance, conflict, government resettlement programs, dispossession of their lands, natural disasters, or incorporation of such territories into an urban area. The extent to which the ethnic groups within the AoI possess the characteristics of IPs is discussed below:

- Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others: ethnic minorities in communities have self-identification of a cultural group but do not demonstrate distinct features of indigenous groups
- Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories: not applicable, minorities in the ACs do not have a collective attachment to the land or habitats, natural resources or territories
- Customary cultural, economic, social, or political institutions that are separate from those of the mainstream society or culture: not applicable, there are no cultural, socio-economic or political institutions in the ACs that would stand out and differ from the established national institutions
- A distinct language or dialect, often different from the official language or languages of the country or region in which they reside: although having their own mother tongue, minorities are well integrated in the ACs and and communicate and understand the national Uzbek language
- Descent from populations who have traditionally pursued non-wage (and often nomadic/transhumant) subsistence strategies and whose status was regulated by their own customs or traditions or by special laws or regulations (this criterion is specific to EBRD PR7): no such people identified in the ACs.

In conclusion, the main reason why the affected groups within the AoI are not considered as IPs is because It means that EBRD PR7 and IFC PS7 apply to communities or groups of Indigenous Peoples who maintain a collective attachment, i.e., whose identity as a group or community is linked, to distinct habitats or ancestral territories and the natural resources therein. It may also apply to communities or groups that have lost collective attachment to distinct habitats or ancestral territories in the Project area, occurring within the concerned group members’ lifetime, because of forced severance, conflict, government resettlement programs, dispossession of their lands, natural disasters, or incorporation of such territories into an urban area. none of them have a collective attachment to the land or natural resources, or have retained socio-economic or political features that make them distinct from the dominant groups and therefore none of the groups have been identified as indigenous peoples.

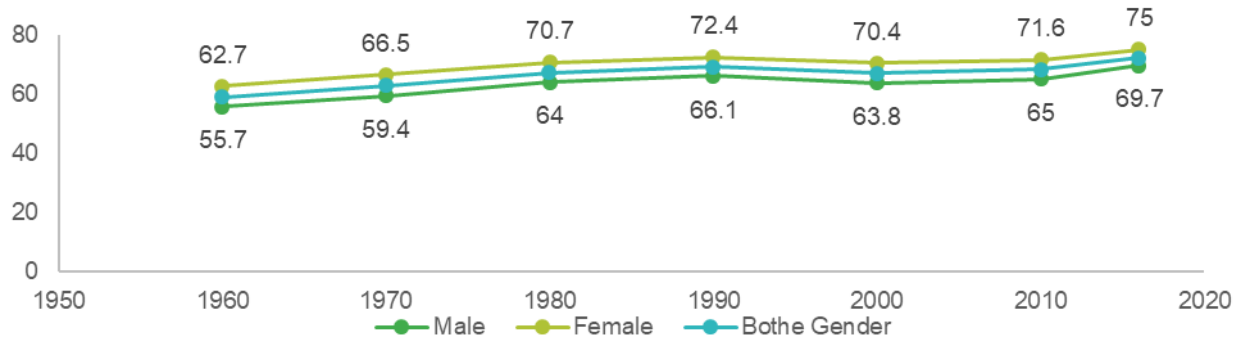
As such, the issues regarding Indigenous Peoples has been scoped out of further analysis in this ESIA.

5.2.6 Health

The life expectancy for Uzbekistan is estimated at 72.3 years[25] for 2016 that gives the country a World Life Expectancy ranking of 100 out of 228 countries. For comparison Tajikistan is ranked 113 with life expectancy of 70.8 years while the United Kingdom is ranked 22 with life expectancy of 81.4 years.

Life expectancy in Uzbekistan differs significantly for male and female population. Male life expectancy was estimated at 69.7 years compared to 75.0 years for female population (Chart 5.7).

Chart 5.7: Uzbekistan life expectancy history



Source: WHO

In overall, life expectancy in Uzbekistan increased between 2000 and 2016 although it displays a similar extent of difference for males and females with women expected to live almost five years longer.

As for the wider AoI, Kashkadarya region is ranked 6 among 13 regions of Uzbekistan with life expectancy of 74.2 years for both genders while Syrdarya region ranks the last out of 13 with average life expectancy of 70.6 years. In both regions, women are expected to live four years longer (76.3 in Kashkadarya and 72.6 in Syrdarya). It appears that in average, the level of socio-economic development of the regions influences inter alia their health indicators which in Syrdarya region these are generally lower if compare to the other Project region.

According to the latest WHO data published in 2017 HIV/AIDS deaths in Uzbekistan reached 393 cases or 0.23% of total deaths (higher rank corresponds to higher HIV/AIDS mortality rate). The age adjusted Death Rate is 1.35 per 100,000 of population ranks Uzbekistan 116 in the world. Almost 4,000 HIV-positive people in Uzbekistan were infected in 2017. According to the National HIV Control Centre, the number of HIV infection cases in Uzbekistan dropped by 4.5% (to 3,983) in 2016 compared to 2015.

Top five causes of death in Uzbekistan remain (i) hypertension (World Rank 2), (ii) coronary heart disease (World Rank 5), (ii) encephalitis (World Rank 13), (iv) liver disease (World Rank 27), (v) kidney disease (World Rank 43).[26] Higher rank corresponds to higher mortality rate.

The average annual mortality rate in the country (2018) is 4.7 deaths per 1,000 population. As for the Project regions, the mortality rates in rural areas are lower if compared to mortality rates in urban areas with the highest 4.5) being in Syrdarya region.

Table 5.18: Mortality rates in the wider AoI, per 1,000 capita

Location	2014	2015	2016	2017	2018
Urban mortality rate					
Kashkadarya region	4.4	4.2	4.5	4.4	4.1
Syrdarya region	5.3	5.2	4.9	5.1	4.8
Rural mortality rate					
Kashkadarya region	3.9	3.9	3.8	4.1	4.1

[25] World Health Organization web- resource via http://apps.who.int/gho/data/node.country.country-UZB?lang=en

[26] World Health Rankings at https://www.worldlifeexpectancy.com/country-health-profile/uzbekistan

Location	2014	2015	2016	2017	2018
Syrdarya region	4.5	4.6	5.1	4.9	4.5

Source: https://stat.uz/en/open-data

Within the local AoI a high mortality rate (as of 2018) is in Kasbi district (14) and the lowest is in Oqoltyn district (5.8) with a strong trend to drop further.

Table 5.19: Mortality rates in the local AoI, per 1,000 capita

Territory	2016	2017	2018	6 months 2019
Kashkadarya region				
Kasbi district	9.3	14.3	14.0	11.1
Nishon district	14.1	13.9	11.8	6.1
Syrdarya region				
Oqoltyn district	12.0	13.9	5.8	3.9
Sardoba district	11.8	13.7	10.8	8.8

Source: https://stat.uz/en/open-data

The infant mortality rate in Uzbekistan (2018) is 10.20 per 1,000 live births. For this parameter Uzbekistan ranks 146th among 200 countries of the world (higher rank corresponds to higher infant mortality rate). In 2018 infant mortality in Kashkadarya region increased against 2016 (9 vs 7.9), and the index grew by 13% over the previous three-year period (2014-2016). The infant mortality rate in Syrdarya region is 12.1 (2018), following an increase by 7% over three-years period (2014-2016) and tends to grow even further.

Table 5.20: Under 5-year infant mortality rates in the wider AoI, per 1,000 live births

Location and Period	Total	Boys	Girls
Kashkadarya region			
2016	11.2	12.4	9.8
2017	13.2	14.6	11.6
2018	12.9	14.4	11.1
Syrdarya region			
2016	17.8	19.0	16.4
2017	17.2	18.4	15.9
2018	15.7	15.8	15.5

Source: https://stat.uz/en/open-data

High morbidity rates are reported (2017) for respiratory diseases (5,154.3 per 10,000 capita) and diseases of the digestive system (2,191.2 per 10,000 capita) which tend to decrease.

Table 5.21: Morbidity by main diseases groups in Uzbekistan

Year	Infectious and Parasitic Diseases		Respiratory Diseases		Diseases of the Circulatory System		Diseases of the Digestive System		Injuries and poisoning	
	"000 people	per 10,000 capita	"000 people	per 10,000 capita	"000 people	per 10,000 capita	"000 people	per 10,000 capita	"000 people	per 10,000 capita
2013	348.4	115.2	4,386.0	1,450.2	562.5	186.0	1,769.9	585.2	973.3	321.8
2014	349.9	113.8	5,130.2	1,667.9	668.5	217.3	1,972.8	641.4	962.8	313.0
2015	379.1	121.1	5,136.4	1,641.1	729.6	233.1	2,207.3	705.2	971.3	310.3
2016	411.2	129.1	5,350.7	1,680.1	753.3	236.5	2,410.4	756.8	1,056.2	331.6
2017	401.6	124.0	5,154.3	1,591.4	743.3	229.5	2,191.2	676.5	1,113.6	343.8

Source: https://stat.uz/en/181-ofytsyalnaia-statystyka-en

The health condition of the population in the local AoI is associated with the environmental situation. Among the most common diseases in the AoI are those associated with polluted drinking water: typhoid, hepatitis,

dysentery, cholera, and various types of cancer. High cancer rates, high infant mortality and hepatitis have been linked by various experts directly or indirectly to the use of toxic chemical in the cotton industry. Although it is difficult to establish a direct cause and effect between environmental problems and their apparent consequences, the cumulative effect of environmental problems associated with water pollution and poor quality of drinking water will be significant, especially in cotton farming areas with no water treatment and lack of centralised portable water supply facilities.

5.2.7 Education

5.2.7.1 Country-wide and Regional Context

In Uzbekistan education includes four major sub-systems: (i) general education, (ii) vocational education, (iii) supplementary education and (iv) vocational training (Table 5.22).

Table 5.22: Education system in Uzbekistan

General education	Vocational education	Supplementary education	Vocational training
Preschool education (children at the age of 6-7 years)	Intermediate vocational education (colleges and technical schools)	Supplementary education for children and adults	Vocational training is intended for persons of various ages to develop professional competences that are needed to perform specific job (service) functions, including operation of specific equipment, technologies, hardware and software, and other professional tools. Such training is focused on developing certain worker or officer skills (to match the requirements for specific grade, class, category) without changing the overall education qualification.
Elementary general education (1-4 school year) – compulsory	Higher education (bachelor's degree)	Supplementary professional education	
Basic general education (5-9 school year) – compulsory	Higher education (specialist or master's degree)		
Secondary general education (9-11 school year)	Higher education (preparation of high-skilled professionals)		

Source: Mott MacDonald

Eleven years of primary and secondary education are compulsory according to the Law on Education №464-I dated 19.04.2018. School education is provided free of charge; however, students have to pay annual fee for using schoolbooks. The official literacy rate in the country is 99.99% (Table 5.23).

Table 5.23: Adult literacy rate in Uzbekistan, %

Indicator	2014	2015	2016	2017	2018
Adult population aged 15 and older	99.98	99.98	99.99	99.99	99.99
Adult male population aged 15 and older	99.99	99.99	99.99	100.00	100.00
Adult female population aged 15 and older)	99.98	99.98	99.98	99.98	99.98
Female young adults aged 15-24	100.0	100.0	100.0	100.0	100.0
Male young adults aged 15-24	100.0	100.0	100.0	100.0	100.0

Source: https://stat.uz/en/181-ofytsyalnaia-statystyka-en

Adult people in the ACs can read and speak in Uzbek language, are writing in Uzbek and majority of adult population also speaks and understands Russian language.

The country operates 9,774 schools (as of 2018-2019 school year) which provide education in the following languages: 8,925 – Uzbek, 836 – Russian, 380 – Kazakh, 363 – Karakalpak, 247 – Tajik, 57 – Kyrgyz, 56 – Turkmen. Total 6,035 schools are functioning in rural areas. Few schools provide education in multiple languages. Even though the country has a developed network of higher education institutions, the number of teaching staff there is relatively small (22,800), and their qualification level is generally not high, e.g. only 7% of teaching staff had professor or doctor degree, and 30% were candidates for scientific degree in 2009.

5.2.7.2 Local and Community Context

In general, there is an established network of pre-schools and schools in the local AoI with few colleges operating in the administrative centres of the districts (Table 5.24). However, no modern schools are there in the ACs. FGDs with local communities identified that in general, the number of nurseries and schools is insufficient, and all facilities require rehabilitation. A Russian-language school would be an advantage in Sardoba with a social centre for single women with children and out of a job (as commented by communities).

Getting higher education is not easy for local communities due to their remote location and economic difficulties in the families. It is also difficult for young people to obtain profession due to very limited number of vocational colleges available locally, especially those focusing on agriculture and farming.

Table 5.24: General education institutions in the local AoI, 2018

Location	Nurseries	Children	Schools	Students	Colleges	Students	Total
Kashkadarya region							
Kasbi	33	2,791	61	34,205	8	3,220	40,216
Nishon	22	3,044	38	28,700	6	3,169	34,913
Syrdarya region							
Oqoltyn	8	1,072	18	8,768	4	839	10,679
Sardoba	11	1,627	20	10,047	5	869	12,903

Source: RoU Ministry of Pre-School Education, RoU Ministry of Public Education

Local nurseries and schools in the Project districts are generally very old and heavily depreciated experiencing health and safety issues associated with poor heat and water supply, lack of sewerage and air conditioning facilities, old furniture and deteriorated outdoor playgrounds.

Jointly with the RoU Ministry of Pre-school Education FE “Indorama Agro” LLC has identified that rehabilitation of the nurseries in Sardoba and Oqoltyn Districts may be included as a matter of priority in the Indorama’s Community Engagement Programme (**CEP**). Currently the Company is undertaking consultation with the Ministry of Pre-school Education on the scope of this programme and identified two nurseries in Sh. Rashidov and T. Malik Sub-districts in Sardoba district to be piloted in 2019.

As a part of the Corporate Social Responsibility (**CSR**) Programme the Company is planning to build a modern school in Kasbi district and rehabilitate local nurseries so that the Project has potential to share benefits with the ACs.

5.2.8 Labour and Employment

5.2.8.1 Country-wide and Regional Context

The active workforce in Uzbekistan makes up 44% of the total population (start of 2019), as shown in Table 5.25. In the wider AoI the available workforce represents 42% in Kashkadarya region and 47% in Syrdarya region.

Unemployment in Uzbekistan is 9.3% (as of start of 2019) while within the wider AoI the unemployment rates are slightly higher (Kashkadarya region) or similar (Syrdarya region) with approximately 167,800 people in the Project regions being out of work in 2019.

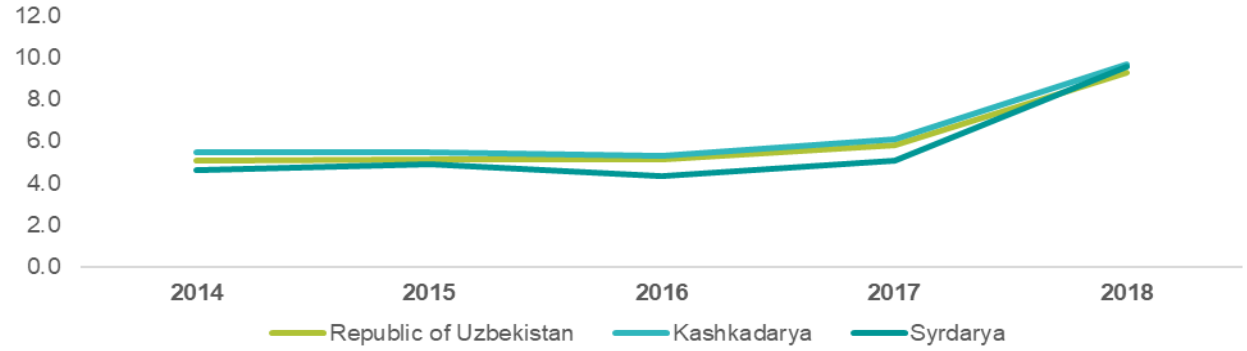
Table 5.25: Unemployment rates in the wider AoI, January 2019

Location	Total population, ‘000 people	Working Age Population, ‘000 people	Employed 000’people	Active Workforce (%)	Unemployed, ‘000 people	Unemployment rate
Uzbekistan	33,254.1	14,641.7	13,273.1	44	1368.6	9.3%
Kashkadarya region	3,213.3	1,353.3	1,222.0	42	131.3	9.7%
Syrdarya region	829.7	390.7	354.2	47	36.5	9.3%

Source: https://stat.uz

The dynamics in unemployment rates in the Project regions reflect the country-wide tendency and indicate their rise in 2018 (Chart 5.8).

Chart 5.8: Dynamics in unemployment rates in Uzbekistan and the Project wider AoI, %



Source: https://stat.uz/en/open-data

The Ministry of Employment and Labour Relations of Uzbekistan clarified that significant increase of the unemployment rate compared to 2017 (3.5%) was mainly associated with improvements in the data gathering methodology on jobseekers, and not with drastic changes in the labour market.

Nationally, the largest share of the employed work is in agriculture, forestry and fisheries sector (27.3%). Other popular sectors include industry (13.5%), trade (11.0%), construction (9.5%) and education (8.2%).

5.2.8.2 Local and Community Context

Workforce and unemployment rates in the ACs

According to information provided by the Employment Centres of Kasbi and Nishon Districts, the unemployment rates in the local AoI compare to the national and regional trend of 9%. Despite recent improvements in the statistics methodology that deals with the unemployed, the actual rate in rural areas is still unclear as not all local people register with the employment agencies. In rural communities there are many people who are underemployed doing odd or seasonal work in the farms or dekhkan farms. So actual rates are most likely significantly higher than the rates of the national statistics service.

The workforce In Kasbi district makes up 57.6% including 46.6% of active workforce (Table 5.26). There are 8,097 officially registered job seekers including 4,140 women and approximately 3,387 young adults (aged 18-30).

Table 5.26: Workforce in the ACs in Kasbi district

ACs	Working age population	Active Workforce	Working out of Country	Jobless	Including			
					Jobless Women	Jobless Young Adults	Jobless with High Education	Jobless with Secondary Education
Kasbi District Total								
192,000	**110,512**	**89,484**	**13,169**	**8,097**	**4,140**	**3,387**	**832**	**2,368**
100%	**57.6%**	**46.6%**	**12%**	**9%**	**51%**	**42%**	**10%**	**29%**
Chulquvar QFY								
3,299	1,950	1,526	343	138	71	58	13	42
100%	59%	46%	18%	9%	51%	42%	9%	30%
Denov QFY								
3,908	2,239	1,814	268	164	84	68	18	47
100%	57%	46%	12%	9%	51%	41%	11%	29%
Fazli MFY								
5,164	2,972	2,408	355	218	112	92	20	66

ACs	Working age population	Active Workforce	Working out of Country	Jobless	Including			
					Jobless Women	Jobless Young Adults	Jobless with High Education	Jobless with Secondary Education
100%	58%	47%	12%	9.1%	51%	42%	9%	30%
Jarkucha MFY								
3,732	2,136	1,732	253	158	81	67	14	48
100%	57%	46%	12%	9.1%	51%	42%	8%	30%
Kamashi MFY								
6,769	3,909	3,167	465	286	147	122	28	85
100%	58%	47%	12%	9%	51%	43%	10%	30%
Khujaki MFY								
4,471	2,565	2,078	308	186	96	79	18	55
100%	57%	46%	12%	9%	52%	42%	10%	30%
Mushqoqi MFY								
2,964	1,872	1,367	201	123	63	52	12	37
100%	63%	46%	11%	9%	51%	42%	10%	30%
Nazartepa MFY								
5,270	3,033	2,457	361	221	114	93	20	66
100%	58%	47%	12%	9%	52%	42%	9%	30%
Nurobod MFY								
3,625	2,116	1,713	251	156	80	66	15	46
100%	58%	47%	12%	9,1%	51%	42%	10%	29%
Pakhtakor QFY								
4,984	2,867	2,323	343	210	108	88	19	63
100%	58%	47%	12%	9%	51%	42%	9%	30%
Total in the ACs of Kasbi District:								
44,186	**25,659**	**20,585**	**3,148**	**1,860**	**956**	**785**	**177**	**555**
100%	**58%**	**47%**	**12%**	**9%**	**51%**	**42%**	**10%**	**30%**

Source: Employment Centre of Kasbi District, July 2019

*Local Population is quoted by the Employment Centre of Kasbi District as annual average as of 1 July 2019

As indicated in Table 5.26 above, unemployment rates in the Project ACs in Kasbi is 9% (or 1,860 people). Of the total number of job seekers women account for 51% (or 956 women in total) while the share of unemployed young adults (both gender) is 41-43% (approximately 785 young adults). The majority of job seekers are skilled workers (60% or 1,305 people) or low skilled workers (30% or 555 people). Approximately 12% of the available workforce are working outside Uzbekistan, mostly in Kazakhstan and Russia. Lack of employment opportunities in the remote Chulquvar community located in Beruniy sub-district urge people to earn incomes outside Uzbekistan (18% of the community workforce is working abroad). See Table 5.27 for details of people working outside of the country.

Table 5.27: People. working out of country, as of 2019

Total in the ACs of:	Kasbi	Nishon	Oqoltyn	Sardoba
Working out of Country	3,148	3,531	14,177	10,566

Source: District Employment Centres

Approximately 5,340 people in Nishon district are out of work, including 2,937 women officially registered with the employment agency. The unemployed young adults make up 25% of registered job seekers (or 1,335 people) and unskilled workforce is estimated to account for 30% of the unemployed (or 504 people).

Table 5.28: Workforce in the ACs in Nishon district

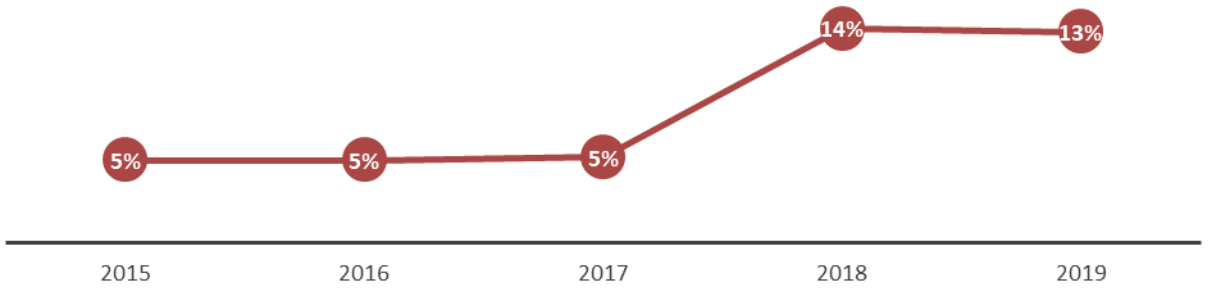
ACs*	Working age-population	Active Workforce	Working out of Country	Jobless	Including			
					Jobless Women	Jobless Young Adults	Jobless with High Education	Jobless with Secondary Education
Nishon District Total								
146,326	**83,462**	**60,275**	**11,234**	**5,340**	**2,937**	**1,335**	**1,815**	**1,602**
100%	**57%**	**41%**	**13%**	**9%**	**55%**	**25%**	**34%**	**30%**
Oydin MFY								
4,941	2,782	2,035	379	180	99	45	61	54
100%	56%	41%	14%	9%	55%	25%	34%	30%
Balkhiyak MFY								
3,743	2,107	1,542	287	137	75	34	46	41
100%	56%	41%	14%	9%	55%	25%	34%	30%
Katla Ankhor MFY								
2,601	1,464	1,071	200	95	52	24	32	28
100%	56%	41%	14%	9%	55%	25%	34%	30%
Kaptarly MFY								
6,829	3,845	2,813	524	249	137	62	85	75
100%	56%	41%	14%	9%	55%	25%	34%	30%
Quirquloch QFY								
4,840	2,725	1,994	372	177	97	44	60	53
100%	56%	41%	14%	9%	55%	25%	34%	30%
Istiqbol MFY								
2,147	1,209	884	165	78	43	20	27	24
100%	56%	41%	14%	9%	55%	25%	34%	30%
Kuksoy MFY								
4,097	2,307	1,688	315	150	82	37	51	45
100%	56%	41%	14%	9%	55%	25%	34%	30%
Shirinobod QFY								
6,245	3,516	2,572	479	228	125	57	77	68
100%	56%	41%	14%	9%	55%	25%	34%	30%
Yangiobod MFY								
4,150	2,337	1,709	319	151	83	38	51	45
100%	56%	41%	14%	9%	55%	25%	34%	30%
A. Qodiriy MFY								
6,403	3,605	2,638	492	234	129	58	79	70
100%	56%	41%	14%	9%	55%	25%	34%	30%
Total in the ACs of Nishon District:								
45,996	**25,897**	**18,947**	**3,531**	**1,678**	**923**	**420**	**571**	**504**
100%	**56%**	**41%**	**14%**	**9%**	**55%**	**25%**	**34%**	**30%**

Source: Employment Centre of Nishon District, July 2019

*Local Population is quoted by the Employment Centre of Nishon District as annual average as of 1 July 2019

Approximately 1,678 people in the Project ACs in Nishon district are out of a job (9%). Of the total number of formally registered job seekers women account for 55% (923 women) while unemployed young adults (both gender) account for 25% (420 people). Majority of job seekers are low skilled workforce (30%) or skilled workers (36%). Labour migration rates are relatively high (14%) in all Project-affected communities in Nishon district. Majority of people migrated from the ACs to work outside Uzbekistan are men (92.7%). Most people who are facing difficulties in earning good incomes in their local area are unskilled workforce (30%) or skilled workers (35%) aged 30 to 55. They account for 60% of the local labour force who left the country to work abroad.

Chart 5.9: Labour migration in Nishon district, 2015-2019



Source: Nishon Statistics Office

Labour migration data provided by the Nishon Statistics Office (Chart 5.9) indicate significant increase of labour migration rates in the district in 2018. There might be few reasons for the increasing labour migration, including tightening of economic constraints, lack of jobs, better earnings offered in Russia and Kazakhstan after their economic recovery (these two countries are main targets for labour migration from communities in Nishon district) as well as increased labour force (by 5%) in 2018 against 2017).

According to information provided by Sardoba District Hokimiyat, the unemployment rate in this small rural district is higher than the average unemployment rate in Syrdarya region and totalled at almost 12% at the start of 2018, when approximately 15% of the workforce worked outside Uzbekistan.

Table 5.29: Estimated unemployment rate in Sardoba district

Period	Population	Working age population	Active Workforce	Working out of Country	Jobless
2018	63,468	35,566	26,940	5,441	3,125
%	100%	56.04%	75.75%	15.30%	11.60%
2019*	64,700	36,256	27,463	5,547	3,186

Source: ESIA Estimates

In assuming that the unemployment rate in Sardoba has not changed noticeably over the year (similar to the regional dynamics), the ESIA study estimates that approximately 3,186 people in the district are looking for jobs and about 5,547 people are travelling to earn in other countries.

The lowest official unemployment rate within the Project footprint is in Oqoltyn district (4%). The active workforce account for 89% of the working age population and this is the best rate in two regions. The ESIA scoping consultation revealed that local employment agency links this noticeable (by 5%) drop in unemployment to the Project since FE “Indorama Agro” LLC initiated a second cluster in the small rural region with immediate effect on the local employment.

Table 5.30: Unemployment rate in Oqoltyn district

Period	Population	Working age population	Active Workforce	Working out of Country	Jobless
2019	51,100	30,200	26,900	199	987
%	100%	59.10%	89.07%	0.66%	4.00%

Source: Oqoltyn District Hokimiyat

Labour out-migration rates in Oqoltyn district are the lowest in the Project footprint and may be link to the poor knowledge of Russian language in the ACs that influences the opportunities for finding jobs elsewhere in Russia and Kazakhstan compared to other districts.

No data is available on the unemployment rates in the ACs in Sardoba and Oqoltyn districts, however homogenous social environment in the rural areas make it possible to assume that the employment status in the ACs is similar to the overall trends in the respective districts of Sardoba and Nishon.

Table 5.31: Workforce in the ACs in Oqoltyn and Sardoba districts

District	Sub-district	ACs	Population	Working Age Population	Active Workforce	Working out of Country	Jobless
Oqoltyn	Sardoba	Dustlik MFY	3,032	1,792	1,596	12	64
		A.Navoiy MFY	2,836	1,676	1,493	11	60
	Musamukhammedov	Sakhovat MFY	3,469	2,050	1,826	14	73
	Uqubayev	Kurkam Diyor MFY	4,060	2,399	2,137	16	85
	Z.M.Bobur	Ahillik MFY	5,501	3,251	2,896	21	116
	Toirov	Shodlik MFY	5,091	3,009	2,678	20	107
	Sub-Total Oqoltyn		*23,989*	*14,177*	*12,626*	*93*	*505*
Sardoba	T. Malik	Yurtdosh MFY	3,661	2,052	1,554	314	180
		Dustlik MFY	4,336	2,430	1,840	372	213
	G.Gulom	Qurg'ontepa MFY	3,806	2,133	1,616	326	187
	Sh.Rashidov	Birlik MFY	3,915	2,194	1,662	336	193
		Ota Yurt MFY	3,138	1,758	1,332	269	155
	Sub-total Sardoba		*18,856*	*10,566*	*8,004*	*1,616*	*928*
Total			**42,845**	**24,744**	**20,630**	**1,710**	**1,433**

Thus, the ESIA study estimates that approximately 1,433 people in the ACs in Oqoltyn and Sardoba districts have no jobs, including 30% of low-skilled workers (or 430 people) and some of them may potentially benefit from the Project employment opportunities during construction and operation. To enhance this beneficial effect the Project would need to include mitigation measures targeted at this group of social receptors.

Employment Opportunities in the Project AoI

Overall, formal employment opportunities in the Project districts are associated with local enterprises and organisations. Informal employment is traditionally offered in small family businesses, farms and dekhkan farms (specifically seasonal jobs during weeding, chopping and harvesting).

Table 5.32: Employment in the Project districts, 2019 (excluding the Project)

Type of Business	Kashkadarya Region		Syrdarya Region	
	Kasbi	Nishon	Sardoba	Oqoltyn
Enterprises and Organisations, including inter alia:	**485**	**225**	**160**	**451**
– Agriculture, forestry and fisheries	75	n/d	n/d	63
– Construction	51	n/d	n/d	48
– Trade	112	n/d	n/d	109
– Transport and storage	16	n/d	n/d	14
– Accommodation and catering	30	n/d	n/d	27
Small (family businesses), including inter alia:	**344**	**544**	**251**	**333**
– Agriculture, forestry and fisheries	63	n/d	54	62
– Construction	48	n/d	23	47
– Trade	102	n/d	78	109
– Transport and storage	13	n/d	7	14
– Accommodation and catering	26	n/d	10	27
Farms, including:	**397**	**610**	**641**	**369**
– Cotton farms	298*	439	396	259
Dekhkan farms	**n/d**	**1,000***	**15**	**n/d**

Source: Passports of Kasbi, Nishon, Sardoba and Oqoltyn districts, 2019

The majority of people in the ACs are occupied in the agricultural sector, including those working informally. Available data[27] indicate that approximately 60-70% of the active workforce in the ACs are working informally without formal labour agreements being engaged in seasonal rural works or odd jobs, i.e. are being underemployed. The Project also has the potential to benefit people working under these conditions.

To date, the Project has offered 2,720 direct jobs for local and international staff in Tashkent Headquarters (15 staff in total, including 27% women) and Kasbi, Nishon and Sardoba Branches of FE “Indorama Agro” LLC. The female staff ration varies between branches from 4% in Nishon district to 9% in Kasbi district. This represents an area for future improvement, especially given the high unemployment rates among women in the Project footprint.

All direct jobs are currently managed through labour contracts with each employee for a period of one year to be extended for 2020 with the intention of eventually having open-term contracts with all staff in the coming few years.

Table 5.33: Staffing profile of the Company, 2019

Age Group	Male	Female	Total
Tashkent Office			
• Less than 18 years	0	0	0
• 18 to 30 years	4	3	7
• 30 to 40 years	4	0	4
• 40 to 50 years	3	1	4
• 50 to 60 years	0	0	0
• beyond 60 years	0	0	0
Sub-total	*11*	*4*	*15*
Kasbi Branch			
• Less than 18 years	0	0	0

[27] Kasbi District Employment Centre, Passport of Nishon District, Passport of Sardoba District, Passport of Oqoltyn District

Age Group	Male	Female	Total
• 18 to 30 years	90	10	100
• 30 to 40 years	303	18	321
• 40 to 50 years	328	29	357
• 50 to 60 years	277	48	325
• beyond 60 years	130	2	132
Sub-total	*1,128*	*107*	*1,235*
Nishon Branch			
• Less than 18 years	0	0	0
• 18 to 30 years	79	8	87
• 30 to 40 years	275	10	285
• 40 to 50 years	277	7	284
• 50 to 60 years	197	8	205
• beyond 60 years	24	0	24
Sub-total	*852*	*33*	*885*
Sardoba Branch			
Less than 18 years	0	0	0
18 to 30 years	22	3	25
30 to 40 years	77	3	80
40 to 50 years	71	7	78
50 to 60 years	40	4	44
more than 60 years	6	1	7
Sub-total	*216*	*18*	*234*
Oqoltyn Branch			
Less than 18 years	0	0	0
18 to 30 years	32	4	36
30 to 40 years	113	3	116
40 to 50 years	108	10	118
50 to 60 years	76	4	80
more than 60 years	0	1	1
Sub-total	*329*	*22*	351
Total	**2,536**	**184**	**2,720**
%	**93%**	**7%**	**100%**

Source: FE “Indorama Agro” LLC

The Project will provide better working conditions and a salary which is at least 15-20% higher than the minimum stipulated wage for a respective grade for all employees. Minimum wage for the first grade (farm workers) is set by law at UZS 679,330.

5.2.9 Forced Labour in the Cotton Sector of Uzbekistan

Forced labour, especially in the agricultural and construction industries, is a recognised problem in Uzbekistan.

Although there is a strong political commitment by the Government and efforts by human rights organisations to address the issue, including international third-party monitoring missions led by the ILO during the harvesting season, and internationally funded technical assistance projects in Uzbekistan’s agricultural sector, forced

labour in Uzbekistan's cotton sector in 2018[28] remained an issue. According to Human Rights Watch, various authorities continued to mobilize some public sector workers, students and employees of private businesses to pick cotton on threat of punishment or loss of employment. In Khorezm, according to Yusuf Ruzimuradov, a human rights activist from Uzbekistan, public sector workers were forced to sign forms that they would pick a minimum amount of cotton.

The ILO continues monitoring the country's cotton fields during the harvesting season. ILO missions are being conducted since 2015 and aim at assisting the GoU in eradicating child and forced labour in the annual cotton harvest and providing the IFIs with a reliable dataset and analysis to inform decisions on investment risks and opportunities in the country. Key achievements over this period include efforts in building fair recruitment capacity, facilitation of dialogue between the government and human rights activists, third-party monitoring of the cotton harvest involving interviews, focus groups, and telephone polls, training of labour inspectors, public prosecutors and human rights activists, strengthening feedback mechanisms operated by the Ministry of Employment and Labour Relations and the Federation of Trade Unions, promoting mass media coverage and training of journalists, exchange of best practices at the international level and assessment of social impacts. Much progress has been made in reducing forced labour, however the 2018 monitoring concluded that a minority (6.8%[29]) of pickers were still forced to participate in the harvest.

5.2.10 Livelihoods and Incomes

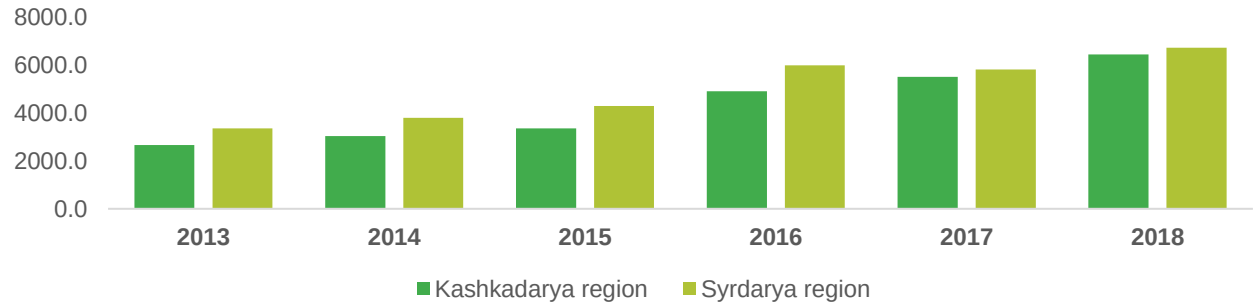
Country-wide and Regional Context

The aggregated income of the population when estimated in national statistics includes cash incomes and incomes in kind as well as other incomes, which tend to be recurrent and are received by a household or its individual members on a regular basis, annually or at shorter intervals. Nationally, the average aggregated income of the population over 2012-2017 increased by 2.2 times bringing the average income growth rate at +17.5% per year or + UZS 639,000 per year.

The average monthly salary in Uzbekistan (2017) is USD 285. To compare, the average monthly salary in Kazakhstan is USD 480, USD 220 in Tajikistan, and USD 615 in Russia.[30]

Incomes of the population in the wider AoI increased by 41% in Kashkadarya region and by 50% in Syrdarya region over five years between 2014 and 2018 but remain lower than the country average by 9% in Kashkadarya region and 9% in Syrdarya region. To compare, the average monthly income in Uzbekistan in 2018 was UZS 7,372.4K.

Chart 5.10: Per capita incomes in the wider AoI, '000 UZS



Source: https://stat.uz/en/open-data

The average total income per capita in Kashkadarya region in 2018 was UZS 6,446.4K (USD 765). In Syrdarya region – UZS 6,724.4 (USD 800).

The largest share of income falls on employment income (68.8%). Incomes from money transfers make up 24.8%. These incomes are largely associated with labour migration within and outside the country. Incomes

[28] Human Rights Watch, Uzbekistan via https://www.hrw.org/world-report/2019/country-chapters/uzbekistan

[29] ILO, https://www.ilo.org/moscow/news/WCMS_681780/lang--en/index.htm

[30] Sourced from the RoU State Committee on Statistics via http://nsdg.stat.uz/goal/4

from services and production for own consumption as well as income from property make up 2.2% and 4.2% respectively.

Local and Community Context

The ESIA consultation with the local farmers, Women's Affairs Committees and FGDs with local community members established that the cotton harvesting has several advantages compared to other daily agricultural wage labour in Uzbekistanis and traditionally treated by the local population as an opportunity for extra earnings. Cotton pickers are paid in cash almost immediately after work is completed, usually every two to five days during the harvesting season. In the current circumstances when rural pickers do not have bank accounts this frequent payment in cash is a substantial financial support to their families. Similarly, cotton harvesting provides many rural women with a unique opportunity to earn an extra cash income which they control and can use to improve the financial situation of their families. Cotton pickers participate in the harvest for 21 days on average and the wages earned represent 39.9% of their personal annual income[29].

Recent ILO monitoring missions observed wage increases and differences in wages for different cotton passes during harvesting, having a positive impact on the recruitment of voluntary cotton pickers. Since 2017 cotton pickers receive more money for picking cotton in the second and third passes and in districts with high scarcity of labour (Oqoltyn and Sardoba).The cotton harvest in Uzbekistan requires up to three passes to make sure that only open bolls are picked and not left in the sun for too long.

Harvesting should be completed before the first autumn rains. Each pass lasts up to 10 days. With each pass the quality and volume of cotton declines. According to ILO monitoring missions, the rate paid per kg of cotton is now increasing as the harvest progressed. This makes it more attractive to pick cotton later in the harvest and is likely to have reduced the higher risk of involuntary labour at that later and less productive stage of the harvest.

Wages for cotton picking keep increasing and in 2019 cotton pickers earned UZS/kg 800 (USD/kg 0.8) for the first pass, USZ/kg 1,000 (USD/kg 1,0) for the second pass and USD/kg 1,200 (USD/kg 1,2) for the third pass.

Table 5.34: Dynamics in wages for cotton picking in Uzbekistan

Period	First Pass	Second Pass	Third Pass
2016	280 UZS/kg	280 UZS/kg	280 UZS/kg
2017	450 UZS/kg	550 UZS/kg	700 UZS/kg
2018	650 UZS/kg	850 UZS/kg	1,000 UZS/kg
2019	800 UZS/kg (+86%)	1,000 USZ/kg (+357%)	1,200 USD/kg (+429%)

Source: Third party monitoring of child labour and forced labour during the 2018 cotton harvest in Uzbekistan. ILO, April 2019 and FGDs, December 2019

According to information provided by the district hokimiyats, there are approximately 500 low-income families in each of the Project districts. Those living in rural areas may be severely impacted by the loss of seasonal works due to mechanisation of cotton weeding and harvesting.

Focus group discussions were undertaken for the ESIA study in December 2019 to augment the baseline. Sensitive social receptors of the Project have been identified as including workers from the local community, specifically women, direct farmers and contracted farmers, farms workers and seasonal workers as described in sub-sections below.

5.2.10.1 Direct Farmers

The cotton farming season lasts approximately five to six months over the year. Primary research reveals that an average farm in the Kashkadarya region used to be 43 ha in Kasbi and 41 ha in Nishon district employing on average four permanent workers in 2018. An average farm in Syrdarya region was 50 ha in Oqoltyn and 54 ha is Sardoba district, employing on average five permanent workers in 2018.

The majority of farmers who participated in FGDs in Kashkadarya region live within 4-7 km distance from the work or even less with the shortest distance being 100 m (Kasbi) and the longest of 10 km (Nishon). Direct farmers from Syrdarya region are mostly based within 2-5 km distance from the work with the shortest distance being 0.5 km (Oqoltyn) and the longest distance being 13 km (Oqoltyn).

FGDs with the direct farmers of FE “Indorama Agro” LLC (who used to run their cotton farms before the Project) were used to help understand the farms’ annual gross revenues in the Project footprint before the Project as summarised in Table 5.36 below. The lowest average annual gross income of a farm in Kashkadarya region was stated by respondents to be UZS 1.3 million (USD 130) in Kasbi district and UZS 0.00-UZS 7,400 (USD 0.74) in Nishon district. The highest average annual gross income of a cotton farm used to be UZS 20 million (USD 2,000) in Kasbi and UZS 29 million (USD 2,900) in Nishon district.

The lowest average annual gross income of a farm in Syrdarya region was UZS 1 million (USD 100) in Sardoba district and UZS 12 million (USD 1,200) in Oqoltyn district. The highest average annual gross income of a cotton farm used to be UZS 160 million (USD 16,000) in Sardoba and UZS 100 million (USD 10,000) in Oqoltyn district.

According to the FGDs, other sources of incomes of direct farmers remained, including:

Kashkadarya region	Syrdarya region
• Vegetable growing	• Vegetable growing
• Wheat	• Fishing
• Livestock	• Livestock
• Poultry farming	• Poultry farming
• Gardening	• Horticulture
• Sericulture[31]	• Melon farming
• Rug making	• Beekeeping

Source: December 2019 FGDs with direct farmers

5.2.10.2 Contracted farms

There are currently 394 farmers contracted by FE “Indorama Agro” LLC in Kasbi district. Out of them, 24 farms (6%) are headed by women. All farmers have Land Lease Agreements signed with the Kasbi District Hokimiyat and Supply Contract for one year with FE “Indorama Agro” LLC starting from 2019. Previously contracted farms had Supply Contracts with local cotton depots. All Supply Contracts will be extended for the next year with all the farmers who will decide to continue cooperation with the Project.

The average size of a contracted farm in Kasbi is 31 ha however farms areas vary significantly from 4 ha to 103 ha in 2019. Female-headed farms are smaller with an average size being 24 ha. In general female-headed farms areas vary from 7 ha to 51 ha.

FGD in Kasbi engaged 13 contract farmers (10 men and three women). Majority (60%) of contract farmers in FGD are based within 2-5 km distance from their work, all others live even closer, less than 1 km.

Only 10 of the 13 contract farmers involved in the FGDs responded to questions about their average annual incomes prior to the start of the Project. The majority of the farmers stated that their gross annual incomes were between UZS 50 million (USD 5,000 annually) to UZS 80 million (USD 8,000 annually) or USD 500 and USD 800 per month. See Table 5.35 for more detail.

Table 5.35: Average annual gross income of contracted farms FGD respondents before the Project

Region	District	up to 50 million	up to 80 million	up to 100 million	up to 150 million	more
Kashkadarya	Kasbi	3	7	1	0	2

Source: December 2019 FGD Survey Responses

All 13 of the FGD respondents in Kasbi district stated that cotton farming was their main source of income but not their sole source of earnings. Contract farmers interviewed stated that they were also involved in the following activities:

- Livestock farming

[31] Silk farming

- Poultry farming
- Vegetable growing
- Melon growing
- Sericulture (silk farming)
- Entrepreneurship or trading
- Bakery
- Pharmacy

FGD with contracted farms estimated costs of an average farm and its key operations during the cotton season (Table 5.36). An average farm in Syrdarya region (30 ha), for example, spends up to UZS 111,504,000 (USD 11,150) to pay for fuel, fertilizers, chemicals and seasonal wages (excluding salaries of farm workers). Expenditures of an average farm in Kashkadarya are higher an may reach up to UZS 148,672,000 (USD 14,867).

Table 5.36: Average cost of cotton farming operations before the Project

Key Operations	Price, UZS	Unit	Diesel Fuel, l/ha	Fuel Price, UZS/l	Total Cost, UZS/ha	Average Farm Costs (30ha), UZS	Average Farm Costs (40 ha), UZS
Tillage	400,000	1	40	4,800	592,000	17,760,000	23,680,000
Planning	200,000	1	20	4,800	296,000	8,880,000	11,840,000
Bedding	90,000	1	7	4,800	123,600	3,708,000	4,944,000
Fertilizing	40,000	1	5	4,800	64,000	1,920,000	2,560,000
Irrigation	100,000	1	0	4,800	100,000	3,000,000	4,000,000
Harrowing	-	-	-	-		-	-
Seeding	-	-	-	4,800	-	-	-
Weeding	90,000	1	7	4,800	123,600	3,708,000	4,944,000
Cultivation	90,000	10	0	4,800	900,000	27,000,000	36,000,000
Deep chiselling	100,000	1	10	4,800	148,000	4,440,000	5,920,000
Suspension	-	-	2	4,800	9,600	288,000	384,000
Topping	40,000	1	0	4,800	40,000	1,200,000	1,600,000
Defoliation	-	1	0	4,800	-	-	-
Chopping	40,000	3	0	4,800	120,000	3,600,000	4,800,000
Harvesting*	800	600	0	4,800	480,000	14,400,000	19,200,000
	1,200	600	0	4,800	720,000	21,600,000	28,800,000
Total						**111,504,000**	**148,672,000**

Source: Mott MacDonald, FGD with contract farmers, December 2019

5.2.10.3 Farms Workers and Seasonal Workers

Contract farmers that were FGD respondents stated that they each employed approximately 60-70 seasonal workers (one worker per 10 ha) and employ permanent workers on their farms. The number of permanent jobs depends on the size of the farm as generally one worker is needed per 10 ha.

There is no restriction as to who the farmer employs as a result of the Project. Employment of seasonal workers was undertaken through mahallas through the following process:

- The mahalla announced it needs “volunteers”
- If the number of “volunteers” was not sufficient the mahalla would contact local employment centres
- Seasonal workers formed brigades.
- Each brigade used to appoint a Brigade Leader to negotiate the terms of payment and scope of work.

Before the Project, brigade leaders were recruited by contracted farms directly and payments with seasonal workers were transacted in cash via the Brigade Leader.

Now all permanent and seasonal workers are recruited by contract farmers using worker contracts. The Brigade Leaders were appointed by FE "Indorama Agro" LLC. The Brigade Leader controls the working conditions of seasonal workers. According to FGDs, FE "Indorama Agro" LLC monitors availability of workers' contracts with permanent and seasonal workers (via the PU Manager and Agronomist), provides decent work and safety trainings, and supports contracted farms with stationeries such as logs and farmer's workbooks (at the expense of the Company).

Types of Seasonal Workers

Seasonal workers incomes in cotton farming are associated with weeding and cotton picking. Cotton weeding is done in five to six stages from April to September. A typical weeding calendar in general, may look like described in the Table 5.37.

Table 5.37: Types of weeding and labour intensity

Stage	Timing*	Task	Labour Intensity
First weeding ("Yagona")	Late April	Removal of excess cotton shoots and grass. Time-consuming and labour-intensive. Requires skilled workers who know how many cotton shoots to leave.	One person covers 0.2 ha in 5 days.
Second weeding	Early May	Removal of grass	One person covers 1 ha in 2–3 days
Third weeding	Mid May	Removal of grass	One person covers 1 ha in 2–3 days
Fourth weeding	June	Removal of grass	One person covers 1 ha in 2–3 days
Fifth weeding ("Chekanka")	Late July / Early August	Removal of the top of the cotton bush. This task requires skilled labourers.	One person covers 1 ha in 3–4 days
Sixth weeding (Final weeding)	End August / September	Removal of grass so it does not get in the way of people picking cotton.	One person covers 1 ha in 2–3 days

Source: Third party monitoring of child labour and forced labour during the 2018 cotton harvest in Uzbekistan. ILO, April 2019
* Note: The actual weeding dates depend on seeding date, cotton variety, and weather conditions.

In 2018, before the Project, cotton weeding involved three groups of seasonal workers in Syrdarya and Kashkadarya regions: "podrachi[32]", daily wage labourers and public-funded employees (Table 5.38).

Table 5.38: Type and proportion of seasonal workers involved in weeding, 2018

Region	Podrachi	Daily Wage Labourers	Public-funded employees
Kashkadarya	50-70%	30-50%	0%
Syrdarya	20-30%	70-80%	1-5%

Source: Third party monitoring of child labour and forced labour during the 2018 cotton harvest in Uzbekistan. ILO, April 2019

The "podrachi" group consisted of local households that enjoyed long standing arrangements with a local farmer to weed cotton. Agreements were usually verbal and covered the whole weeding season. This group represented 20–70% of all workers involved in weeding on the farm. In most cases, the farmer did not pay in cash but rather provided the households with a small area of land (e.g. 0.5–2 ha) for them to grow secondary crops after the main harvest. Some farmers also provided in-kind payment (wheat, cooking oil, cotton stalks, etc.) and/or small sums of money (e.g. UZS 200,000–300,000 per season). Some farmers also provided "podrachi" with irrigation water and access to machinery for agricultural production.

The weeding is mostly done by the women of "podrachi" households, and in many cases the men were employed as full-time workers on the farm. Some farmers provided "podrachi" households with a certificate of employment and salary statements, which the households could use to apply for social support. "Podrachi" households preferred farms in close proximity to their homes and were reluctant to work for poorer and more remote farmers who therefore had to recruit labour from other groups. To attract "podrachi" the farmer usually

[32] An Uzbek word for local households with long standing arrangements with local farmers to weed cotton

addressed people in the community directly or local households came directly to the farmer and asked to be engaged.

The daily wage labourers group included individuals and brigades that were hired for a single day or for a defined period of time. Farmers paid the workers on a daily basis. The proportion of daily wage labourers varied in the Project regions from 30–80% of the total workforce. There was a new and growing trend of women increasingly forming brigades of daily wage labourers in order to negotiate collectively to achieve better conditions. Many farmers saw this as a benefit as they could save time by negotiating directly with the Brigade Leader instead of individually with every single worker. According to the ILO Third-party Monitoring Mission, 70–90% of daily wage labourers involved in weeding were women.

Public-funded workers are registered unemployed who received a monthly salary of UZS 500,000 from a special fund established by the GoU to assist unemployed people. Farmers in Syrdarya region used public-funded workers for weeding in 2018. This group of workers were involved in cotton weeding for remote farmers and for farmers that had difficulties recruiting local labourers. Farmers hired such labourers for weeding by approaching the hokimiyat or mahalla.

Incomes of Seasonal Workers During Weeding

Table 5.39 below summarises employment arrangements incomes and typical duration of work by each group of seasonal workers.

Table 5.39: Incomes and employment duration of seasonal workers involved in cotton weeding, 2018

Category	''Podrachi''	Daily Wage Labourers	Public-funded Workers
Employment arrangements	Verbal agreement (renewed yearly)	Directly with workers or via Brigade Leaders	Hokimiyat or mahalla
Typical duration of work	20-40 days per season	60-100 days per season	
Income	Seasonal income UZS 1-1.75 mln or in-kind payment	Seasonal income UZS 0.8-3.5 mln cash payment	Fixed monthly salary UZS 0.5 mln

Source: Third party monitoring of child labour and forced labour during the 2018 cotton harvest in Uzbekistan. ILO, April 2019

Cotton weeding represented an important opportunity for families and individuals to earn an additional income. The weeding income was particularly important for women due to the lack of full-time job opportunities available to them in rural areas and the scarcity of daily wage jobs for women in late spring and early summer.

Incomes of Cotton Pickers

According to the ILO Third Party Monitoring Mission Report, 54% of pickers were women in 2018. On average each cotton picker participated in the harvest for 21 days and picking represented 40% of cotton picker's personal annual income. A cotton picker could earn UZS 40,000–150,000 (USD 5-18[33]) per day in 2018, while the average daily wage for other kinds of agricultural work was UZS 15,000–30,000 (USD 18-36). So, working during the harvest, cotton pickers can earn at least two to three times more than in any other agricultural activity.

5.2.10.4 Local Community Members

Six FGDs with community members (66 people in total) were undertaken in four Project districts to describe livelihoods and incomes of the households in the Project footprint, including four FGDs with women (43 women) only. For all communities, cotton is the main source of income. Among the FGD participants, 68% are households of five people and more. Uzbeks are 85%, Tajiks are 5% and Kyrgyz are 2%. The remaining 8% did not answer this question.

Around two-fifths (44%) of households have individual farms (including 22% of cotton farms) and 9% are running dekhkan farms. For all participants who do not run farms cotton is not the only source of income as they are not growing cotton, however incomes from weeding and picking are supplementary incomes from early spring till October and are discussed in Sub-section 5.2.10.3.

[33] 1 USD = 8,350 UZS as of December 2018

While cotton is the major source of income, the respondents from the FGDs identified that they had varied other means of income in addition to cotton. The following were identified as alternative sources of livelihood in the Project area:

- Livestock
- Poultry farming
- Vegetable growing
- Silk cocoon production
- Wheat
- Melon growing
- Gardening
- Entrepreneurship
- Beekeeping
- Baking
- Construction
- Office work.

5.2.10.5 Women's Income

The source of women's income, in the Project area is varied. Women are the primary workers in weeding, topping, chopping and harvesting (Sub-section 5.2.10.4) and are using income streams generated by these operations to have their own earnings. Some incomes outside of cotton farming, such as silkworm farming are also predominantly undertaken by women.

Women were also primary workers in a number of the seasonal cotton farming activities. Below in Table 5.40 is a reflection of the income earned from cotton farming in three of the Project districts.

Table 5.40: Income for women from cotton farming prior to the Project, UZS

District	Weeding	Topping	Ploughing/ bursting	Chasing/ Trimming	Cotton Picking
Kasbi	25,000 per day	25,000 per day	25,000 per day (several times per season after irrigation)	25,000 per day	700 by the farm + 300 co-financed by the Government per 1 kg of cotton
Nishon	15,000-20,000 per day	15,000-20,000 per day	No information	No information	800 per 1 kilo
Oqoltyn	120,000 per 1 ha or daily 20,000	No information	No information	50,000 per 1 ha	800,000 – 900,000 per 1 kg

Source: December 2019 FGD Survey Responses.

As stated by respondents in FGDs, other sources of income for women include:

- Production of milk products
- Poultry farming
- Rabbit farming
- Ostrich farming
- Fishery farming
- Trade
- Services (translation, hairdressers)
- Weaving (carpets)
- Baking
- Sewing

An average household in the Project footprint is a family with three to five children. Being responsible for their children women cannot afford full-time jobs since there is a lack of kindergartens and operational ones are old

and heavily deteriorated with no connection to sewage and unsafe playgrounds. Information on available jobs in the Company are not advertised so far and women in communities are not aware of opportunities that the Project may offer to them. Women in local communities were not invited for training by the Company but are aware of the CAP initiated by the Company to develop mulberry trees plantations as community assets bringing additional income to the households within the Project footprint.

5.2.11 Poverty

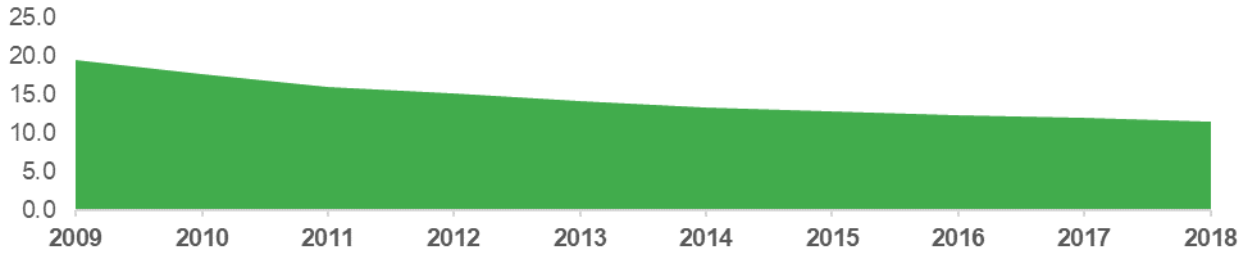
Poverty in Uzbekistan is dropping. Uzbekistan has seen sustained growth over the past several years and if trends continue, the country is expected to be on its way towards a country free from extreme poverty. Extreme poverty was defined by the United Nations as an income below the international poverty line of $1.90 per day (in 2011 prices, equivalent to $2.16 in 2019), set by the World Bank.

Until recently, Uzbekistan did not regularly provide the international community with the official data needed to estimate internationally comparable poverty rates. Consequently, the latest official and internationally comparable estimates date from the early 2000s, when 62.1% the population lived under $1.90 per day.

However, in 2018 a new study was launched by the World Bank in consultation with the National Statistical Agency of Uzbekistan and other partners called Listening to the Citizens of Uzbekistan. This study included a comprehensive baseline survey that can be used to estimate comparable poverty rates. These estimates suggest that in 2018 the poverty rate measured at the $3.2/day line stood at 9.6% of the population, and 36.6% at the $5.5-a day line. The national plan of the development of the Republic of Uzbekistan in 2017-2021 contains the goal to increase the employment and real incomes of population.

The national poverty line is the minimum level of income deemed adequate in a particular country. National Uzbekistan statistics (2018) indicate that the share of the population below the national poverty line makes up 11.4% of the total population nationally or approximately 3,722,863 people and their number reduced by 8.1% over recent ten years (Chart 5.11).

Chart 5.11: Financially disadvantaged population in Uzbekistan over ten-year period, %



Source: https://stat.uz/en/open-data

While Uzbekistan has experienced increased urbanization in recent years, the share of those living in poverty in Uzbekistan is higher in rural areas. Based on national poverty data[34] available only for the wider AoI (2017) people living in poverty account for 22,4% of total population in Kashkadarya region and 16,1% in Syrdarya region.

5.2.12 Food and Agriculture Context

Uzbekistan is an agricultural country and is still facing an issue of undernourishment, such as iodine, folic acid, iron and vitamin A. According to the UN Food and Agriculture Organization, the prevalence of malnutrition in Uzbekistan is 6.3%, which means that 1.9 million people are undernourished. Uzbekistan ranks 80th out of 113 countries in the Global Food Security Index in 2018. The Global Food Security Index provides a worldwide perspective on which countries are most and least vulnerable to food insecurity and how resource risks increase vulnerability. The higher the score the more resilient is the country. Among the most resilient countries are Singapore, Ireland, UK, US and the Netherlands.

[34] Sourced from the RoU State Committee on Statistics via http://nsdg.stat.uz/goal/4

According to the information of the RoU Ministry of Finance, 0.5% of the National Budget (or USZ 330 billion) are funds for targeted support to farms managing low-yielding land and supplying products for public needs. Since 2014 investments in agriculture increased by 64% to the level of UZS 2,379,300 in 2017. In terms of comparing various funding sources in agricultural sector of Uzbekistan, 23% is invested from the National Budget, 38% by companies, 30% from commercial banks loans, 8% are international investments and 1% from other sources.

Table 5.41: Dynamics of the agricultural sector in Uzbekistan

Description	2014	2015	2016	2017	2018
Crop area of agricultural crops ('000 ha)	3,678.2	3,694.2	3,706.7	3,474.5	3,396.0
Dynamics of agricultural sector growth as a percentage to the previous year, including:	106.3	106.1	106.3	101.0	100.2
• crop production	105.9	105.5	105.7	98.2	95.3
• livestock	106.7	106.9	107.0	104.1	106.5

Source: https://stat.uz/en/open-data

Dynamics of the agricultural sector (Table 5.41) indicate that the crop production in Uzbekistan has slightly dropped during recent two years while the livestock sector tends to grow. Cotton and wheat remain to be major crops in Uzbekistan and occupy over 85% of total sown area in Syrdarya region and over 78%[35] in Kashkadarya region.

5.2.13 Access to Utilities and Social Services

According to national statistics (2018), only 31% of the rural population in Uzbekistan have access to safe potable water. The vast majority of rural settlements (90%) are not connected to sanitation systems. Basic water supply services are accessible to 87.4% of the rural population.

Table 5.42: Population in Uzbekistan with access to safe drinking water

Description	2016	2017	2018
People with access to safe drinking water, urban (%)	86.5	86.5	86.5
People with access to safe drinking water, rural (%)	31.1	31.1	31.1
People with access to safe drinking water, total population (%)	51.2	51.2	51.2
People with access to at least basic drinking water services, urban (%)	98.7	98.7	98.7
People with access to at least basic drinking water supply services, rural (%)	87.4	87.4	87.4
People with access to at least basic drinking water supply services, total population (%)	91.5	91.5	91.5

Source: https://stat.uz/en/open-data

Within the local AoI potable water supply services are accessible for over 80% of the rural households in Oqoltyn district and 96% in Sardoba district with noticeable improvement against 2018 (Table 5.43). In Kasbi and Nishon districts only 55% of rural households have access to potable water supply services.

Table 5.43: Tap at home service coverage in the local AoI, % of households

Location	2018		2019	
	Total	Rural Areas	Total	Rural Areas
Syrdarya region, including:	**79.2**	**78.5**	**79.7**	**84.1**
– Oqoltyn district	75.2	83.4	77.3	86.3
– Sardoba district	82.6	84.7	91.3	96.1
Kashkadarya region, including:	**69.8**	**57.0**	**69.9**	**57.2**
– Kasbi district	63.2	55.1	63.3	55.4
– Nishon district	61.6	54.7	61.8	54.5

Source: https://stat.uz/en/open-data

[35] State Committee on Statistics, 2017 data.

Rural households in the local AoI have different access to centralised wastewater disposal services. Households in Oqoltyn district have no access at all. The situation in Sardoba is different with almost 62% of rural household connected to sewerage systems. In Kasbi and Nishon districts almost 80% of households do not have access to sewerage services at all.

Table 5.44: Sewerage service coverage in the local AoI, % of households

Regions	2018			2019		
	Total	Urban	Rural	Total	Urban	Rural
Syrdarya region, including:	**37.9**	**52.2**	**27.7**	**35.8**	**52.6**	**23.9**
– Oqoltyn district	0.0	0.0	0.0	0.0	0.0	0.0
– Sardoba district	58.1	44.0	62.0	57.8	43.6	61.8
Kashkadarya region, including:	**45.9**	**55.2**	**30.7**	**46.3**	**59.2**	**30.9**
– Kasbi district	30.1	35.0	20.1	30.4	35.4	20.9
– Nishon district	28.8	33.6	19.0	28.9	33.7	19.2

Source: https://stat.uz/en/open-data

Available data indicate that communities in Sardoba district do not benefit from centralised gas supply services while 13% of households in rural communities in Oqoltyn are connected to gas supply systems. Majority of households in Kasbi and Nishon have access to gas supply service (66% and 65% respectively).

Table 5.45: Gas supply service coverage in the local AoI, % of households

Regions	2018		2019	
	Total	Rural	Total	Rural
Syrdarya region, including:	**64.7**	**44.1**	**65.4**	**46.3**
– Oqoltyn district	35.9	12.7	37.0	12.9
– Sardoba district	20.8	0.0	21.7	0.0
Kashkadarya region, including:	**78.7**	**69.1**	**78.9**	**69.4**
– Kasbi district	69.9	65.7	69.9	65.9
– Nishon district	68.8	64.0	68.9	64.5

Source: https://stat.uz/en/open-data

All households in the ACs are connected to power supply grids.

Based on information available via national statics and district hokimiyats (Table 5.46) the ACs within the local AoI have limited access to banks services, sports facilities and other community services. Health infrastructure is insufficient for the ACs and only healthcare stations operate in rural areas.

Table 5.46: Community and social services and infrastructure in the local AoI, 2018

Location	Health-care	Trade	Banks	Postal service	Sports	Catering	Libraries	Culture and Arts
Syrdarya region	30	254	28	106	20	80	21	5
– Oqoltyn district	6 (2)*	109		5		27		
– Sardoba district	11 (1)*	79	2 (37)**	6		11	7	
Kashkadarya region	43	315	31	294	25	105	35	7
– Kasbi district	11	112	3	15		132		
– Nishon district	13 (2)*			19				

Source: https://stat.uz/en/open-data, Passports of Oqoltyn, Sardoba, Kasbi and Nishon districts
* Including the number of hospitals
** Bank offices

FGDs with local communities in Sardoba and Oqoltyn districts undertaken in December 2019, indicate that there are no stadium or other sports facilities in the ACs that communities see as advantage to have. If available, social centres for single women with children and without work may help women to take care of children and earn additional incomes for themselves.

Respondents of FDGs in Kasbi suggested that potential support from the Project may be in helping households to connect to gas supply network because communities use wood-fired ovens to cook. Also, water supply networks are in poor condition in most of the ACs. In Fazli situation is even worse since there is not portable water supply network and households use water pits to supply potable water in their houses.

FGDs in Nishon district suggested that local communities may benefit if a new hospital is built and if houses are connected to the centralised gas supply system instead of using gas cylinders.

5.2.14 Transport Infrastructure and Public Transport Services

Currently Uzbekistan has strong transportation capacities to satisfy internal demand of freight and passenger traffic. Highway transportation prevails in freight shipment and accounts for 88.6%[36] in the total freight traffic. Table 5.47 provides a summary of existing highways and railroads in Syrdarya and Kashkadarya regions.

Table 5.47: Transport infrastructure in the Project regions, km

Region	Highways		Railway Roads	
Syrdarya region	Gulistan-Tashkent	118 km	Gulistan-Tashkent	115 km
	Syrdarya-Tashkent	73 km	Syrdarya-Tashkent	70 km
	Yangier-Tashket	145 km	Yangier-Tashket	142 km
Total Syrdarya		**336 km**		**327 km**
Kashkadarya region	Karshi-Tashkent	470 km	Karshi-Tashkent	400 km
	Karshi-Samarkand	155 km	Karshi-Samarkand	152 km
	Karshi-Bukhara	180 km	Karshi-Bukhara	170 km
	Karshi-Termez	280 km	Karshi-Termez	370 km
	Karshi-Shahrisabz	120 km	Karshi-Kitob	122 km
Total Kashkadarya		**1,205 km**		**1,214 km**

The city of Karshi (Kashkadarya region) operates an airport with regular flights to Tashkent and Moscow (Russia).

In 2016 the Asian Development Bank provided a USD 198 million loan to rehabilitate 77 km section of the Karshi-Shahrisabz-Kitab highway that crosses Kashkadarya region to improve tourism and mobility infrastructure and support development of domestic and foreign trade. This road project will upgrade two sections of the existing motor road connecting the cities of Karshi, Shahrisabz and Kitab that to a 4-lane cement concrete road to meet the road safety standards and climate adaptation requirements. After the project, daily traffic on the Karshi-Kitab section will increase to 14,000 vehicles by 2022 against 9,408 vehicles in 2015.

Intercity bus routes are operated in the Project local AoI: three bus routes are connecting communities in Oqoltyn and Sardoba districts with the city of Gulistan and two bus routes (each is one bus daily) connect communities in Kasbi and Nishon districts with the city of Karshi.

Table 5.48: Public transport services in the Project area, 2019

Municipality	Public transport routes	Schedule
Syrdarya Region		
Oqoltyn district	2	Both routes from Gulistan (ШАЙ 206, ШЙТ 210)
Sardoba district	1	Gulistan-Sardoba (ШЙТ 252)
Kashkadarya Region		
Kasbi district	1	1 bus daily, via Karshi
Nishon district	1	1 bus daily, via Karshi

Generally, road safety is still bad although there are certain improvements on main road and infrastructure. The Project will use interfiled and local roads to transport cotton to the gins and then to the railway station to deliver to spinning facilities. Most of the road in the ACs are in poor condition, poorly maintained and require

[36] Socio-economic Status of the Republic of Uzbekistan. January-June 2019. – Quarterly Statistics Digest of RoU National Committee on Statistics

rehabilitation. FGDs with communities suggested that the Project may put efforts in rehabilitation of community roads primarily those routing to schools.

5.2.15 Gender and Equal Opportunities

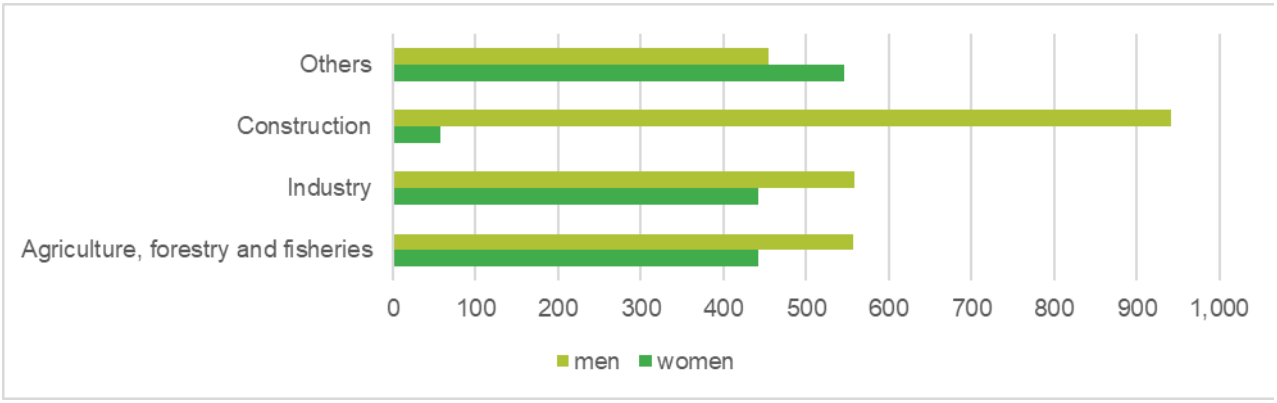
5.2.15.1 Country-wide and Regional Context

Uzbekistan, as a new democracy, still lacks legislation on gender equality, although recent national reforms have been improving women's economic opportunities. In February 2019, the President of Uzbekistan signed a decree that aims to "fundamentally improve support for women and strengthen the institution of the family". The law criticised the current situation with women's rights and their participation in affairs of the country.

The Women's Affairs Committee of Uzbekistan, set up in 1991, cooperates with political parties, representing women's interests, provides support and assistance to women in different social fields, such as, healthcare, education, culture, sport, etc. It also opens 'adaptation centres',[37] carries out seminars, workshops and trainings for women, who want to open their own business, offers them consultative services, arranges exhibitions and fairs. The Women's Affairs Committee also undertakes a legislative work drafting gender-related legislation to improve women's status in the society. The web site of the State Committee on Statistics (www.gender.stat.uz) was designed in conjunction with the Women's Affairs Committee of Uzbekistan in 2013. The web site contains information in three languages: Uzbek, Russian and English to provide gender-sensitive information to users in such areas as population, healthcare, labour, welfare, etc. However, no sustainable mechanism for regular collection of gender statistics has been established so far.

Nationally, employment statistics indicate (Chart 5.12) that women employed in industries and agriculture sector of Uzbekistan account approximately for 44% of total employed and only 6% of total employed in the construction sector. The same proportion remains in the project regions.

Chart 5.12: Employment segregated by sector and gender, 2017



Source: https://gender.stat.uz/en/

Agriculture is a primary source of livelihood for rural communities. Although women play a major role in agricultural production, they are underrepresented in groups responsible for decision-making in agriculture. Female entrepreneurs operating small and micro businesses in agriculture face distinct constraints due to limited land ownership and lease rights. The needs and priorities of female farmers should be taken into account ensuring they participate in planning and implementation of each agricultural project in the country.

Each year, international research bodies look at women's position in society and publish reports on this topic. The World Economic Forum's Global Gender Gap Index, which monitors gender equality throughout the world includes in the index all Central Asian states, apart from Uzbekistan and Turkmenistan due to the lack of gender-disaggregated statistics. Uzbekistan was nevertheless included in a recent World Bank report ("Women, Business and the Law 2018"), which analyses attitudes towards women across the world. The average global score for Uzbekistan is 74.71. The national statistics ranks Uzbekistan as 70.63 rating the

[37] 136 centres, have been opened to provide targeted assistance to woman in difficult social situations in the regions, including Kasbi, Sardoba and Oqoltyn districts (https://wcu.uz/en/menu/moslashuv-markazlari)

country better than in the Middle East and North Africa, where women's rights are strictly de jure. Uzbekistan limits women's rights de facto: most Uzbeks believe that the man is still the head of the family; it is the man who decides what to spend the family's income on, where his children will go to school and whether his wife can work outside the home.

The Gender Inequality Index (**GII**) was introduced in the 2010 Human Development Report by the United Nations Development Programme (**UNDP**) and is used to measure gender disparity. It reflects gender-based inequalities in three dimensions – reproductive health, empowerment, and economic activity. Reproductive health is measured by maternal mortality and adolescent birth rates; empowerment is measured by the share of parliamentary seats held by women and attainment in secondary and higher education by each gender; and economic activity is measured by the labour market participation rate for women and men. The GII is interpreted as loss in human development due to inequality between female and male achievements in the three GII dimensions.

Uzbekistan has a GII value of 0.274, ranking it 59 out of 160 countries in the 2017 index. In Uzbekistan, 16.4% of parliamentary seats are held by women, and 99.9% of adult women have reached at least a secondary level of education compared to 99.9% of their male counterparts. For every 100,000 live births, 36 women die from pregnancy related causes; and the adolescent birth rate is 16.5 births per 1,000 women at the age of 15-19. Female participation in the labour market is 53.8% compared to 77.9% cent for men. For comparison, GII index ranked Kyrgyzstan and Tajikistan as 91 and 69 respectively.

5.2.15.2 Local and Community Context

Out of 455,800 resident population in four project districts 225,300 (or 49.4%) are women (Table 5.12). In all four Project districts more than 90% of the key decision-making positions in the local government are found to be dominated by men. All traditional headship positions in the district hokimiyats are occupied by men. At the Company level, only 7% of positions in FE "Indorama Agro" LLC are occupied by women (Table 5.33). This gender rate is true for all branches of the Company and considered to be disproportionally low against the overall 44% of women engaged in the agricultural sector in the country.

FGDs with women from the directly affected communities held in December 2019 in four Project districts, revealed the following key findings:

- Low levels of education and limited experience among local women make it difficult for them to compete for key positions that require higher levels of education
- Difficulties for educated women to get a permission from their husbands to occupy administrative positions in the Company due to it predominantly male staff
- The average household size in the AoI is seven (a family with five children) and childcare is generally regarded as a woman's domain, which makes women a vulnerable group in respect of reliance on their husband's income and lack of freedom to get a full-time job
- With the Company's technological developments in the cotton farming process and mechanisation of farming tasks, the seasonal manual field works, such as cotton weeding, topping, trimming, picking are no longer available in the Project footprint – this primarily affects women
- There are high unemployment rates among women in the Project footprint
- Cultural, traditional and religious attitudes do not allow for equal consideration of issues affecting women
- All respondents in FGD survey spend most of their time performing household responsibilities such as rearing of livestock (milking, watering, feeding), household activities (childcare, preparing food, cooking, cleaning and gardening).

Key areas of concern for women in the ACs are linked to employment, community assets, access to utilities, health, education and personal incomes. The following expectations of female respondents were identified in respect of the Project during the FGDs:

- Employment: getting a job at cotton or silk spinning factories in the future
- Community assets: social investments in rehabilitation of old kindergartens, community roads, construction of a social centre for single unemployed women with children

- Access to utilities: rehabilitation of water supply networks, connect households to the gas supply network (as communities still use gas cylinders)
- Health: construction of a new hospital
- Education: general development of education, help in getting higher education, support in obtaining a profession and establishing a Russian-language school
- Incomes for women: arrange for a distributor(s) to sell finished products manufactured by women.

These key areas of concern and existing constraints discussed in focus groups with women have been considered in the assessment and mitigation proposed in Section 5.4 and the Project LRP will be designed enhance limited opportunities available for women in the Project AoI.

5.2.16 Deprivation and Vulnerable Groups

This ESIA has developed tailored mitigation measures for both impact minimisation and management, as well as targeted public consultation and engagement for the most deprived and vulnerable groups within the ACs. These groups are considered to be:

- Women: particularly those who were previously involved in seasonal work who have lost employment opportunities as a result of the project and the increased mechanisation of production that is expected in the near future.
- Unskilled seasonal or farm workers: these are landless low-income workers with job and income insecurity
- Children in the local communities: who typically work seasonally and are at risk of exploitation and dangerous working conditions.
- Families who have lost their main income provider

The ESIA study estimates that female population in the ACs makes up about 67,239 people, including 37,733 working age women. Approximately 8,315 labour migrants and their families are highly vulnerable to the loss of seasonal incomes and emerging employment opportunities for local communities.

In total, there are 21,946 families (Table 5.13) in the ACs. Living conditions tend to be worse in the villages than in urban areas specifically taking into account that not all households may benefit from access to water and wastewater utilities and gas supply. Mostly disadvantaged are 1,045 families in Fazli and Cultuvar communities as they do not have access to drinking water supply system.

Families, who lost their main income provider are considered as disadvantaged households experiencing difficulties in sustaining their incomes due to the loss of household members involved in economic activity. Available data indicate a large variance in the number of such families between the Project districts (Table 5.49).

Table 5.49: Disadvantaged families in the Project wider AoI, 2019

Location	Low-income Families	Lost Breadwinner Families	Period
Kashkadarya region			
Kasbi	517	813	As of 01.04.2019
Nishon	n/d	n/d	-
Syrdarya region			
Sardoba	444	n/d	As of 01.01.2019
Oqoltyn	511	280	As of 01.04.2019

Source: Kasbi District Passport, Sardoba District Passport and Oqoltyn District Hokimiyat

With the workforce ranging in the ACs between 56% and 59% remaining 34% to 41% are the elderly and children (estimated to total at approximately 44,229 to 54,541 people). According to the available national statistics, people with disabilities who rely on pensions and social support allowances make up about 2% of the total population in Uzbekistan. About 35% of people receiving pensions and social support allowances are those with disability. The elderly, children and disabled family members often do not have income which puts more pressure on the main income provider, creating increased vulnerability for families without a main income provider.

The vulnerable groups identified here have been considered in the planning of stakeholder engagement for the Project. Measures used include community liaison via well respected and trusted community representatives and Women's Affairs Committees in mahallas, distribution of hard copies of the Project documentation in Uzbek and use of widely circulated newspapers and radio for disclosure of Project-related information. In addition, meetings have been undertaken in mahallas during the consultation process to inform vulnerable groups about the Project and listen to their views. Mitigation measures will be designed to address concerns and interests of the disadvantage and vulnerable people affected by the Project and enhance potential benefits the Project may them offer.

5.3 Assessment of Social Impacts

5.3.1 Land Development, Preparation and Construction Phase Impacts

5.3.1.1 Land Use Changes and Economic Displacement

The land allocated to the Project has always been used for farming operations and does not accommodate any houses or small businesses. Land parcels allocated for the Project in Phase I were brownfield sites with a long track record of cotton and wheat cropping. In total 1,155 cotton farms (including 65 female-headed farms) were approached by the Government in the land acquisition process and 1,068 farms (including 12 female-headed farms) agreed to terminate their LLAs, 87 farms decided to continue their own operations, and four households asked and received replacement land. All farmers who agreed to terminate their respective LLAs were offered to join FE "Indorama Agro" LLC and work full time based on long-term labour contracts. Approximately 481 (45%) of the farmers who terminated their LLAs are now working in the Company. There are 500 farmers who terminated their farming businesses who are not employed by the Project and for which Hokimiyats and Indorama have no information. Based on the number of farms with terminated LLAs and their size, there is an estimated 4,337 farm workers who may have lost jobs, however, they did not opt for a job opportunity with the Project. As well as for farming, a small amount of land was allocated for related infrastructure, namely residential complexes and gin factors. Table below summarises the land acquisition and displacement impacts.

Table 5.50: Land acquisition and displacements impacts

Land needs	Number	Total parcels	Acquired or supply land	Displaced people	Compensation paid	Comments
Direct farming	1,068 farms acquired	3,709	54,196 ha	481 who are hired by Company; 87 who kept their own operations; 500 no data on what they have done Estimated 4,437 workers from 500 farms where no one accepted employment opportunities	None	4 districts, more land to be acquired in Phase II
Contract farming	394 contracted to supply produce	NA	12,536 ha	394 with contracts to provide supply land organised in 4 PUs Currently 1,299 farm workers permanently employed	Not applicable	Only in Kasbi District contract farming to extend to Nishon District
Residential complexes	2, one each in Karshi and Gulistan		4.5 ha	None	None	None
Gins	2		24 ha	None	None	None
Maintenance structures, sheds and buildings	60	51	NA	None (they would be reflected in the direct farming numbers)	To be determined	

Land needs	Number	Total parcels	Acquired or supply land	Displaced people	Compensation paid	Comments
Improvements to land (drainage, excavations)	No data	No data	No data	82 farmers paid	UZS 758,615,480 (about to USD 80,000)	
Total	**1,462**	**NA**	**66,760.5 ha**	**As above**		

Source: FE “Indorama Agro” LLC

In Phase I, the Project acquired 3,709 land parcels covering 54,196 ha, including 50,037 ha of irrigated land and 4,194 ha in poor condition. In total 1,155 cotton farms (including 65 female-headed farms) were approached by the Government in the land acquisition process and 1,068 farms (including 12 female-headed farms) agreed to terminate their LLAs while 87 farms decided to continue their own operations, and four were given replacement land.

The above analysis describes the direct economic displacement impacts and Phase I compensation related to the termination of farms, secondary employment losses are described in more detail and assessed separately in the operations phase impact assessment (refer to Sub-section 5.3.2.1).

In conclusion, the farmers whose land is required by the Project are considered to be receptors of *medium* **sensitivity** because they are already vulnerable and impoverished with only limited means to deal with the changes. Change in land use and tenure is considered to be *major* **magnitude** because it is a largely an impact that has already happened, will continue for Project life (LLAs are for 49 years), because many people in four districts are impacted, and the resilience of communities in 22 subdistricts are impacted. Together *medium* sensitivity and high magnitude makes this an unmitigated **adverse impact** of **major significance**.

5.3.1.2 Temporary Employment Generation

In total 968 temporary jobs will be generated by the Project during construction. Temporary employment opportunities for the directly and indirectly affected communities (identified in Sub-section 5.1.3.1) will be associated with the construction of:

- Two residential complexes in the cities of Gulistan and Karshi (refer to baseline section 1.2.2.2)
- Two gin plants in Karshi and Oqoltyn districts (refer to baseline section 1.2.3.5)
- Seven farm depots across all the four districts of Nishon, Kasbi, Sardoba and Oqoltyn (total employment generation to be assessed)
- 5 km PTL in Oqoltyn (the associated Project to be implemented by Uzbekenergo) (refer to baseline section 1.4).

The impacts related to each of these activities is described below.

An international Turkish contractor was selected to deliver construction of residential complexes and ginning facilities of the Project in compliance with good international industry practice. Two low-rise residential complexes are being constructed in the cities of Karshi and Gulistan. The construction started in September 2019 and will last approximately seven months. The construction of ginning facilities in Kasbi and Sardoba districts started in September 2019 and the construction period will take approximately five months. The contractors contract includes a provision to comply with national laws of Uzbekistan.

The construction of residential complexes and ginning facilities is likely to generate employment for 400 workers on average (both skilled and unskilled) for all sites (Table 5.51).

Rehabilitation/construction of seven farm depots will commence in 2020. The contractor selection process is not yet initiated but the intention is to engage an international contractor. The construction period is estimated to take approximately five months with the commissioning before the end of 2020. The Project will generate employment for 553 workers on average (both skilled and unskilled) for all sites (Table 5.51).

Table 5.51: Average temporary employment during construction

Construction Site	Total	Contractor's staff				Indorama staff (skilled)
		International staff (skilled)	From the ACs (unskilled)	From the area and wider Uzbekistan (skilled)	Including female staff (skilled)	
Residential complex in Gulistan	102	3	25	70	2	2
Residential complex in Gulistan	102	3	25	70	2	2
Gin plant in Kasbi	102	3	25	70	2	2
Gin plant in Sardoba	102	3	25	70	2	2
Sub-total temporary jobs offered to date	*408*	*12*	*100*	*280*	*8*	*8*
Farm depot 1	80	2	25	50	2	1
Farm depot 2	80	2	25	50	2	1
Farm depot 3	80	2	25	50	2	1
Farm depot 4	80	2	25	50	2	1
Farm depot 5	80	2	25	50	2	1
Farm depot 6	80	2	25	50	2	1
Farm depot 7	80	2	25	50	2	1
Sub-total temporary jobs to be offered	*560*	*14*	*175*	*350*	*14*	*7*
Total temporary jobs:	**968**	**26**	**275**	**630**	**22**	**15**
%	**100%**	**3%**	**29%**	**67%**	**2%**	**2%**

Source: FE "Indorama Agro" LLC

The contractor's facilities associated with the construction of residential complexes and gin plants are located within the sites boundaries and have an average capacity to accommodate up to 80 workers per site. No accommodation is arranged for workers at construction sites. Staff coming from abroad is based in local hotels in Gulistan and Karshi while the local workers are travelling to work from their homes. The working hours on all sites during the construction phase are eight hours per day and one-hour lunch break in one shift. International skilled and management staff include 3 people while 95 local people from communities and the wider area have unskilled and skilled jobs per site. The Company has appointed two full-time male engineers per site for the construction period to monitor contractor's performance as well as progress and completion of construction activities. These engineers are working full-time on sites.

The local construction workers are employed by the Contractor based on fixed-term labour contracts in compliance with the national requirement. Nevertheless, temporary construction workers are considered to be of high **sensitivity** having higher levels of vulnerability to labour conditions on site, terms of engagement, occupational health and safety arrangements and security of sites as well as late or non-payment of wages, relationship with their employer and mistreatment by management because low/unskilled workers may not be aware of their rights and how to deal with poor treatment of employers.

Similar site and construction workforce arrangements will apply to the farm depots construction. No workers accommodation will be arranged on sites. International skilled and management staff will include 2 people and 75 unskilled and skilled jobs per site will be offered to people from local communities and the wider area. The Company will appoint one full-time male engineer per site for the construction period to monitor contractor's performance as well as progress and completion of construction activities.

The PTL construction will take three months and this associated infrastructure project will be implemented by Uzbekenergo using their own construction labour resources due to complexity of the task and skills required of the construction workforce in this sector. No employment opportunities will be available to local communities including women during PTL construction.

The unemployment rates and opportunities for local communities to benefit from the Project was discussed during the consultation process with local employment centres and the ACs during the ESIA Scoping Phase and in FGDs in December 2019. These confirmed that people living in the Project area are keen to benefit from the presence of the Project, especially women who are engaged in seasonal works in the fields or jobless. Temporary employment opportunities are expected to contribute to the local economy and household incomes, especially in the poorer surrounding rural areas. The Project will also provide opportunities to engage low skilled and seasonal workers.

This is expected to be impact that is *minor* in **magnitude** as approximately 100 temporary jobs for unskilled workforce from the directly affected communities are made available during construction for a period of less than one year, while there are approximately 6,405 unemployed in the ACs including approximately 2,000 unskilled workers. A relatively small number of local people in the ACs will be able to benefit employment opportunities available in the construction phase.

Local people in the ACs are considered to be of *high* **sensitivity** as they are already vulnerable, there are high levels of unemployment, few opportunities for permanent employment emerging in the rural areas and high demand for permanent jobs, especially by local women. The impact is therefore assessed to be a **beneficial impact** of **minor to moderate significance**.

5.3.2 Operation Phase Impacts

5.3.2.1 Operational Employment

The economic displacement and employment changes already experienced in Phase I land acquisition and which is expected in the remainder of construction as discussed above, will continue as the Project enters the operational phase with more low skilled job losses and indirect economic displacement in the agricultural sector. This will however be partly offset by the creation of new more highly skilled and more secure employment. Predicted changes in the operation employment are described in this subsection which concludes with an assessment impact of the long-term net employment change that is expected as a result of the Project.

It is estimated[38] (Table 5.52) that a total of 4,337 permanent jobs and 9,070 seasonal jobs have been and will be lost as a result of 1,068 farms being liquidated because of the Project. These farms offered largely informal low-paid unskilled jobs primarily during the cotton farming season.

Table 5.52: Estimated employment losses as a result of the Project land acquisition

Location	Farms terminated LLAs	Average farm size, ha	Average permanent jobs per farm	Total permanent jobs lost	Total seasonal jobs lost **
Kashkadarya region					
– Kasbi	340	30-40	3-4	1,412*	2,720
– Nishon	326	30-40	3-4	1,304	2,608
Syrdarya region					
– Sardoba	207	20-30	2-3	621	1,242
– Oqoltyn	195	20-30	2-3	1,000*	2,500*
Total	**1,068**			**4,337**	**9,070**

Source: Estimated by Mott MacDonald except:

Notes: * Estimated by District Hokimiyat
**no. of jobs does not equal no. of affected seasonal workers as some had more than one job at different times of the year

Seasonal jobs available in the cotton farms are associated with the need to attract additional workers during weeding and harvesting. The average labour demand of a farm is one worker per ha, thus it is estimated that an average farm in Kashkadarya region (of 30-40 ha) engaged in average three to four seasonal labourers during weeding and for cotton picking, thus during one season, an additional six to eight seasonal jobs were

[38] Information on permanent jobs lost as a result of the Project land acquisition was provided by district hokimiyats in Kasbi and Oqoltyn. For other two districts (Nishon and Sardoba) the cut in permanent jobs was estimated based on the average size of the fam in the district and the average permanent labour demand of a farm (one worker per 10 ha area)

generated by each farm. A similar approach has been used to estimate seasonal jobs in Syrdarya region where an average farm of 20-30 ha generated four to six seasonal jobs during the cotton farming season. The seasonal job losses in contracted farms result from changes in the farming techniques making weeding less labour intensive. A large number of these roles were filled by women, so they are the group that will feel the impacts of these job losses most severely.

The low skilled employment losses and seasonal income reductions will be partially offset by the creation of new jobs, that are on the whole more stable and better paid. It is estimated that 3,270 new permanent skilled jobs are generated or will be generated by FE “Indorama Agro” LLC in the Project districts and approximately 2,500 skilled permanent jobs for farm workers will be retained in the contracted farms. To date the Company has already provided 2,720 new skilled jobs in the agricultural sector (direct farmers mainly) in Kasbi, Nishon, Sardoba and Oqoltyn districts, as well as fifteen administrative jobs in the city of Tashkent. Information on these jobs is provided in Table 5.33.

The Project will provide housing for non-resident employees of the branch offices and their families and would need to establish a monitoring procedure to meet with the EBRD/IFC Guidelines on Worker Accommodation. Two new residential complexes (refer to Sub-clause 1.2.2.2) will be managed by the Company’s own staff starting from 2020 and the Company will recruit 10 local people (most likely from Karshi and Gulistan) to operate and maintain these facilities.

The Project will offer local administrative and skilled jobs for local communities in the ginning facilities. Manpower for the ginning process will require operational staff (operators and maintenance engineers) and administrative staff (plant manager, secretary, accountant, warehouse staff, driver, cashier, clerks, and general service workers (guards). The manpower requirement for each gin and cotton depots is 210 people thus the Project will create employment for another 420 people.

Seven farm depots to be constructed across the Project area will generate 120 administrative and skilled jobs by the end of 2020 that will be made available to people from the ACs.

It means that in 2020 the Project will offer additional 550 jobs upon commissioning of residential complexes in Gulistan and Karshi, two gin plants in Kasbi and Sardoba and seven cotton depots in Kasbi, Nishon, Sardoba and Oqoltyn districts as detailed in the table below.

Table 5.53: Additional jobs in the Company, 2020

Facility	Number of jobs	Year of Commissioning
Residential complex in Gulistan	5	2020
Residential complex in Karshi	5	2020
Gin plant in Kasbi including cotton depots	210	2020
Gin plant in Sardoba including cotton depots	210	2020
Farm depots (Kasbi)	30	2020
Farm depots (Nishon)	30	2020
Farm depots (Sardoba)	30	2020
Farm depots (Oqoltyn)	30	2020
Total	**550**	

Source: FE “Indorama Agro” LLC

The total employment number will be reviewed from time to time as the Project implementation progresses. All regular staff is currently employed using one-year fixed term contracts. The labour law of Uzbekistan has provisions for such arrangements with the regular staff when one-year fixed term contract is renewed annually although fixed-term contracts do not provide any long-term employment security for the staff.

In addition to these permanent jobs, 2,000 seasonal jobs (weeds chipping) will remain in the Company and will be made available for the directly affected communities during weeding, as well as approximately 2,500 unskilled seasonal jobs offered by contracted farms. The weeding and harvesting incomes are particularly important for women who are considered highly vulnerable due to the lack of full-time job opportunities available to them in rural areas resulting in high unemployment and underemployment rates among women (refer to Sub-section 5.2.8).

In summary, as depicted in the Table 5.54 below, the Project is expected to result in a net reduction of 3,257 jobs. However, the majority of jobs lost (4,570) are unskilled, temporary, seasonal low-income jobs in the informal sector, where there is a higher risk of child and forced labour. There will be a net increase (by 1,433) of permanent skilled agricultural sector jobs that are more secure, higher salary, and offer opportunities for skills development of the local workforce. Particular benefits are expected to be felt by vulnerable groups such as women and seasonal workers who currently have high levels of income insecurity making them less resilient to economic shocks and impoverishment.

Table 5.54: Estimated long term net employment changes as a result of the Project

Type of employment/livelihood activity	Job losses	Job offered by Indorama / contracted farmers	Net employment change
Permanent skilled agricultural sector jobs	4,337 (in the farms liquidated by the land acquisition process)	3,270* (direct farmers and worker in ginning and other facilities hired by end 2020) 2,500* (contracted farmers hired by end 2020) = 5,770	+ 1,433
Unskilled seasonal jobs**	9,070 (informal, low paid insecure)	2,000* (mainly weed chipping jobs) 2,500* (contracted farmers) = 4,500	- 4,570
Total:	**13,407**	**10,270**	**-3,137**

Source: *Estimated by Mott MacDonald except: * estimated by FE “Indorama Agro” LLC

Notes: ** No. of jobs not equal no. of affected farmers; some farmers have more than one job at different times of the yr.

In conclusion, local people, especially jobless women, young adults and seasonal workers are considered to be of *high* **sensitivity.** Although there will be a net loss in the total number of jobs, the lost jobs are seasonal and there will be a net increase in permanent highly skilled opportunities, so the magnitude of impact is considered to be **minor beneficial**. Therefore overall, the long-term change in employment as a result of the Project has been assessed to be a beneficial impact of **minor to moderate significance.**

5.3.2.2 Livelihood Changes During Operation

As discussed above, predicted changes in the operational employment will affect seasonal incomes of cotton pickers and weeding workers from directly and indirectly affected communities. Seasonal cotton pickers will not be engaged by the Company for harvesting cotton due to mechanisation of harvesting operations in direct farming. Seasonal workers are now partly engaged in weeding due to changes in the cotton farming techniques and harvesting at contracted farms. Less labour is now required for weeding operations as chopping reduced almost by 3 times (from 3 to 1-2 passes), manual topping is no longer required as replaced by application of herbicides while first weeding is combined with harrowing and seeding and is no more required as a manual operation. Also, before the Project cotton was picked manually in five passes, now harvesting by contracted farms is completed in one pass.

FGDs with forty-four male and four female direct farmers of FE “Indorama Agro” LLC were held in December 2019 in all Project districts to understand the impact on the incomes of the direct farmers in the Project footprint. Direct farmers employed by the Company are former owners or farm workers of the affected cotton farms and their incomes were mainly generated through cotton farm operations.

Forty-eight direct farmers responded to the surveys during the FGDs about the impact that the Project has had on their incomes. The majority (67%) stated that their income had improved and 33% (only farmers from Sardoba and Oqoltyn districts) stated that their income has decreased since the start of the Project (refer to Table 5.55 for details).

Table 5.55: Change in incomes of the direct farmers since the start of the Project

Region	District[39]	No. of Respondents	Income Increased with Joining the Company	Income Remained the Same	Income Decreased with Joining the Company
Kashkadarya	Kasbi	13	13	0	0
	Nishon	11	11	0	0
	Total	**24**	**24**	**0**	**0**
Syrdarya	Oqoltyn	13	8	0	5
	Sardoba	11	0	0	11
	Total	**24**	**8**	**0**	**16**
Total Surveyed		**48 (100%)**	**32 (67%)**	**0 (0%)**	**16 (33%)**

Source: December 2019 FGD Survey Responses.

FGDs with direct farmers and local communities were also used to understand the impact on incomes of seasonal workers in the Project footprint. Due to scarcity of labour resources in Oqoltyn district, one seasonal worker may earn up UZS 1.1 million (USD 110) per month during the cotton weeding season while in other districts monthly incomes are lower and vary from the lowest of UZS 550,000 (USD 55) in Nishon district to UZS 770,000 (USD 77) in Kasbi district. Going forward, the Company will continue engaging approximately 2,000 weeding workers during the cotton farming season.

Table 5.56: Monthly incomes of seasonal workers during cotton weeding in the AoI, 2019

Region	District	Rates, UZS	Monthly Income, per person
Kashkadarya	Kasbi	UZS 35,000 per day (USD 3.5)	UZS 770,000 (USD 77)
	Nishon	UZS 25,000-30,000 per day (USD 2.5-3)	UZS 550,000-660,000 (USD 55-66)
Syrdarya	Sardoba	UZS 220,000 per 1 ha (USD 22)	UZS 720,000 (USD 72)
	Oqoltyn	UZS 50,000 per day (USD 5)	UZS 1,100,000 (USD 110)

Source: Mott MacDonald, focus group discussions, December 2019

Generally, in 2019 harvest pickers were paid UZS 800 (USD 0.8) per 1 kg for the first pass and UZS 1,200 (USD 1.2) per 1 kg for second and third passes. One experienced picker may pick 100 kg of cotton per day and earn between USD 8 and USD 15 a day depending on the district. Thus, a monthly income (22 days) of one picker varied between USD 176 (Kasbi) and USD 330 (Nishon).

Table 5.57: Incomes of cotton pickers, 2019

Region	District	Rates, UZS/1 kg	Picking rate/day	Daily Wage	Monthly Income
Kashkadarya	Kasbi	UZS 800-1,200 (USD 0.8-1.2)	100 kg	UZS 80,000-120,000 (USD 8-12)	UZS 1,760,000-UZS 2,640,000 (USD 176-USD 264)
	Nishon	UZS 1,200-1,500 (USD 1.2-1.5)	100 kg	UZS 120,000-150,000 (USD 12-15)	UZS 2,640,000-UZS 3,300,000 (USD 264-USD 330)
Syrdarya	Sardoba	UZS 900-UZS1,200 (USD 0.9-1.2)	100 kg	UZS 90,000 (USD 9)	UZS 1,980,000 (USD 200)
	Oqoltyn	UZS 900-1,200 (USD 0.8-1.2)	100 kg	UZS 80,000-120,000 (USD 8-12)	UZS 1,760,000-UZS 2,640,000 (USD 176-USD 264)

[39] According to information provided by the Farmers' Associations, the average monthly salary of a cotton farm worker varies significantly in the Project districts in 2019: from UZS 600,000 in Kasbi and Nishon districts to UZS2,000,000 in Oqoltyn and Sardoba districts that is most likely influenced by availability of labour resources in the regions.

Source: Mott MacDonald, focus group discussions, December 2019

Starting from 2019, the number of jobs available for cotton pickers has reduced in the Project footprint, as FE "Indorama Agro" LLC has mechanized harvesting, although cotton picking is partly retained in contracted farms. As a result, manual cotton picking is no longer a major source of income for the local communities. The majority of respondents (59%) from the FGDs[40] with local community members stated that their incomes increased with the Project. However, 20% were made worse off (Table 5.58).

Table 5.58: Change in income since the start of the Project

Region	District	No. of Respondents	Income increased	Income remained the same	Income decreased
Kashkadarya	Kasbi	22	21	1	0
	Nishon	13	11	1	1
	Total	**35**	**32**	**2**	**1**
Syrdarya	Oqoltyn	5	3	3	1
	Sardoba	17	0	7	10
	Total	**24**	**3**	**10**	**11**
Total Surveyed		**59**	**35**	**12**	**12**
%			**59.3%**	**20.3%**	**20.3%**

Source: December 2019 FGD Survey Responses.

FGD respondents from Sardoba district (17%) were the least satisfied with the income changes and stated that their incomes decreased with the Project. They suggested that summer cotton picking allowed to earn money for the whole winter period. Now this field work is lost, and local people have to travel to other districts to pick cotton, at their own cost.

The number of employment opportunities in cotton farming that were traditionally undertaken by women has also reduced now that the Project is underway. This is primarily a result of mechanization of these tasks. During the cotton season women are mostly engaged in cotton weeding and harvesting. Women in communities prefer to work in female brigades with a female Brigade Leader and negotiate collectively terms of work and payment to achieve better conditions. Female workers in the brigade do not communicate personally with the farmers. Payments are made per hectare of land. The Brigade Leader decides how many people will work per hectare. Payments are made after completion of work on the land plot, usually in two to three days. Table 5.59 provides a summary of the incomes available for women in the Project footprint after the Project and shows that income streams for women have been reduced.

Table 5.59: Income for women from cotton farming after the Project, UZS

District*	Weeding	Topping	Ploughing / bursting	Cotton Picking	Chasing / Trimming
Oqoltyn	50,000 per day	No longer required	No longer required	800 – 900 per 1 kg	Will remain for women
Sardoba	No response from consultees	No response from consultees	No response from consultees	No response from consultees	No response from consultees
Kasbi	No longer required	No longer required	Hand ploughing 70,000-100,000 per day	No longer required	No longer required
Nishon	No longer required	No longer required	Hand ploughing 70,000-100,000 per day	1,400-1,500 sum per 1 kg now	No information

Source: Mott MacDonald, focus group discussions, December 2019
*FGD with community women in Sardoba district did not estimate cotton farming incomes of women

The money that women earned from cotton weeding and picking represented the major part of their personal income. A household could earn up to 40% of the annual income during weeding and harvesting of cotton and

[40] The FGDs were conducted with 125 participants, of which there were 51 women and 74 men. There was a total of 48 directly employed farmers, 13 contract farmers, and 64 others from local communities.

rely on this supplementary income during winter before cotton production starts again (Sub-section 5.2.10). Now local cotton pickers have to go to other districts to pick cotton.

Apart from the reduction in seasonal jobs, access to dried cotton plants for use as biomass fuel has been reduced for local households because the Company has brought in new technology and now uses plant remains as soil organic matter. Women in communities traditionally used ovens for cooking and the cotton plants as fuel. They now have to buy coal at their own cost (USD 0.15-0.3/kg or to buy dried cotton plants (at USD 0.15-0.25[41]).

Rumours were raised in the FGDs that starting in 2020 all works will be mechanized and there would be no employment opportunities for women. FGDs in Kasbi and Nishon suggested to establish a silk weaving manufacture so that women can work there and produce silk. Silk weaving has the potential to provide economic empowerment for local women and this will be enhanced through the implementation of the Livelihood Restoration Plan prepared for the Project (issued as a standalone document).

The direct farmers employed by the Company are paid monthly salaries and have regular income throughout the year. The average salaries that the Company offers to its operational and management staff are summarised in Table 5.60.

Table 5.60: Company staffing and wages by positions, gender and residence

Position	Average monthly wage, UZS	Total staff, including:	Male	Female	International	Local
Tashkent Office						
Management positions	24,416,667	6	5	1	3	3
Operational positions	7,206,000	9	6	3	0	9
Sub-total Tashkent Headquarters	*15,811,333*	*15*	*11*	*4*	*3*	*12*
%		*100%*	*73%*	*27%*	*20%*	*80%*
Kasbi Branch						
Management positions	9,214,900	30	30	-	12	18
Operational positions	1,193,901	1,205	1,098	107	-	1,205
Sub-total Kasbi Branch	*5,204,401*	*1,235*	*1,128*	*107*	*12*	*1,223*
%		*100%*	*91%*	*9%*	*1%*	*99%*
Nishon Branch						
Management positions	13,628,571	14	14	-	9	5
Operational positions	949,897	871	838	33	-	871
Sub-total Nishon Branch	*7,289,234*	*885*	*852*	*33*	*9*	*876*
%		*100%*	*96%*	*4%*	*1%*	*99%*
Sardoba Branch						
Management positions	14,921,333	15	15	-	15	8
Operational positions	2,259,494	219	201	18	-	219
Sub-total Sardoba Branch	*8,590,413*	*234*	*216*	*18*	*15*	*227*
%		*100%*	*92%*	*8%*	*6%*	*97%*
Oqoltyn Branch						
Management positions	6,054,644	35	35	-	8	27
Operational positions	1,519,822	316	294	22	-	316
Sub-total Oqoltyn Branch	*3,787,233*	*351*	*329*	*22*	*8*	*343*
%		*100%*	*94%*	*6%*	*2%*	*98%*
Total	**8,136,523**	**2,720**	**2,536**	**184**	**47**	**2,681**

[41] In 2020 prices

Position	Average monthly wage, UZS	Total staff, including:	Male	Female	International	Local
%		*100%*	*93%*	*7%*	*2%*	*98%*

Source: FE “Indorama Agro” LLC

In general, monthly salaries of the operational staff are 30%-70% higher than incomes of farm workers or seasonal weeding workers in the Project footprint. However, monthly incomes of cotton pikers are generally higher (by 30%-60%) than salaries of the operational staff in the Company but are available only during few months of the year (Table 5.61).

Table 5.61: Monthly incomes in the Project footprint, UZS

Project District	Company’s direct farmers (12 months)	Warm workers (8 months)	Seasonal weeding workers (4-5 months)	Seasonal cotton pickers (1-2 months)
Kasbi	UZS 1,193,901	UZS 600,000	UZS 770,000	UZS 1,760,000-UZS 2,640,000
Nishon	UZS 949,897	USZ 600,000	UZS 550,000 USZ 660,000	UZS 2,640,000-UZS 3,300,000
Sardoba	UZS 2,259,494	UZS 2,000,000	UZS 720,000	UZS 1,980,000
Oqoltyn	UZS 1,519,822	UZS 2,000,000	UZS 1,100,000	UZS 1,760,000-UZS 2,640,000

Source: FE “Indorama Agro” LLC, Farmers Associations, FGDs

Although the Project will provide net increase (by 1,433) of permanent skilled agricultural sector jobs offering regular incomes, the reduction of seasonal incomes will be significant and will result from a net loss of 4,570 seasonal jobs in the Project footprint.

Farm workers are *high* **sensitivity** social receptors and have little capacity to absorb the loss of permanent employment and for them it will be difficult to find full-time job when the number of cotton farms has reduced while alternative employment requires other skills or may urge labour migration. Seasonal workers are considered to be of *high* **sensitivity** as for them it is very difficult to find replacement for lost seasonal incomes and they are traditionally specialising in farming operations. Seasonal workers lack other skills to fit for alternative employment and do not have access to training. Moreover, availability of seasonal works will also be impacted by operation of other 5 clusters in the Project footprint and the ongoing optimisation of land for farming. Local communities and especially women are social receptors of *high* **sensitivity** to the loss of supplementary incomes associated with cotton weeding and harvesting as there are very few other alternatives available for them in the local area. Additionally, increased labour out-migration among men may potentially result in social tension as families are losing their traditional livelihood and women are left alone and made solely responsible for their families with little opportunity for personal income and support while their husbands are away in Russia or Kazakhstan seeking for earnings. The **magnitude** of impact is considered to be *major* as loss of incomes is occurring at a large scale and will need special measures to restore the livelihood of affected groups. Without mitigation the **adverse impact of livelihood changes** is thus assessed to be **major** at the operation phase. This impact will be mitigated through the livelihood restoration measures the Company is committed to implement under the Project LRP and other measure as Gender Action Plan, including inter alia such measures as livelihood trainings and CEP/CAP launched in 2019 to supplement community incomes in the Project footprint as detailed in Sub-section 4.6.

5.3.2.3 Improved Labour Conditions in the Project Supply Chain

FE “Indorama Agro” LLC is part of the Indorama Group and is committed to corporate values in respecting human rights as embodied in the Universal Declaration of Human Rights, International Covenant on Civil and Political Rights as well as International Covenant on Economic, Social and Cultural Rights. The Group’s Human Rights Policy establishes that infringing on human rights must be avoided and that the laws of the countries where the Group operates will be complied with.

The Indorama Group adopts reasonable and inclusive practices throughout all operations of the Group and seeks that internal standards for respecting human rights, fair treatment of employees, eradication of child

labour, forced or bonded labour are set forth and complied with across all operations. The Group is committed to provide and maintain a safe and healthy working environment for own employees, contractors and in the supply chain. In compliance with the internal standard, no person shall be employed unless such employment is in compliance with all applicable laws and regulations concerning age, hours, compensation, health and safety.

Being a newly established Group entity, the Company has not yet formally introduced Group polices in human resource management, health and safety, environment protection and human rights. These policies will be adopted in the new operation as Project policies and will be applied in the primary supply chain processes.

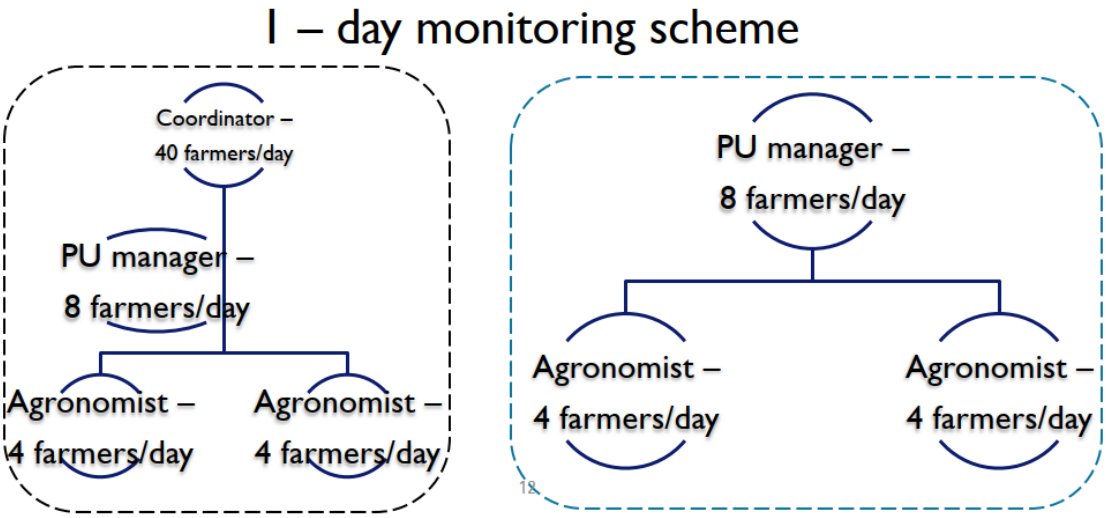
The Project has appointed Human Resource (**HR**) Managers in all branch offices who are responsible for recruitment, HR management and staff grievances although the workers' grievance mechanism is not yet formalised and there is no formal HR Policy in place. These management tools along with dedicated resources to implement them as well as internal and external monitoring and reporting arrangements will be key instruments in managing Project contractors and the primary supply chain to comply with international human rights and labour requirements.

The Company intends to set up a Trade Union Committee to support the right of workers for association and protect their interests. As an option, TU Committee, when established, may be used for implementing the Project workers' grievance mechanism in compliance with the national requirement.

The Project key social goals are to improve working conditions and treatment of workers in the cotton farming sector of Uzbekistan and eventually eradicate the risk of child and forced labour at least within the Project footprint. These efforts will be sensitive to how effectively the Project manages its own farming operations and the primary supply chain (contracted farms). The Project is committed to introduction of best practices and sustainable cotton farming to international standards based on the BCI principles for direct and contract farming operations. To respond to these goals the Project intends to build up a robust cotton supply chain monitory and improve labour conditions of their farm workers and seasonal labourers. Mechanisation of weeding and harvesting of the direct farming operations cut down on demand for the external labour and significantly reduced the risk of forced labour. The contract farming scheme will retain seasonal jobs and will be exposed to the risks of child labour and forced labour.

To date the Project has introduced a management and monitoring system for contracted farms. Four Producer Units have been established, each headed by one PU Coordinator who is supported by PU Manager and agronomists refer to (Figure 5.1). There are currently 394 farms engaged by the Project under the contract farming scheme. The Project uses online bot on the messaging service "Telegram" which is highly popular in Uzbekistan and via "Telegram" each farmer may access the Coordinator, PU Manager or Agronomist from any field at any time. Along with operational tasks, each Coordinator is assigned with responsibilities to monitor labour standards compliance and working conditions at the contracted farms. Any issues identified by the Coordinators are to be reported to the Branch Manager.

Figure 5.1: Producer Unit monitoring scheme



Source: FE “Indorama Agro” LLC

The PU Manager role includes:

- Panning acreages and volumes of cotton to be contracted by the Company at the PU level
- Negotiating terms and conditions and signing of contracts with the contracted farms
- Arranging input provision to the contracted farms (seeds, fertilizers, chemicals, fuel and services)
- Arranging advance payments to farms
- Arranging agronomic support and supervision of farms’ agrotechnological operations
- Organising harvest and cotton logistics

PU Managers monitor that contracted farms have labour contracts with all farm workers in line with the national requirement and report to their Coordinators.

The Agronomist role involves responsibilities for:

- Maintaining the Supplier Data Management System
- Provision of agronomic support and training
- Performance monitoring

Agronomists also conduct awareness raising discussions and on-farm workshops on the issues of sustainable cotton production practices.

Currently 394 contracted farms provide permanent employment for 1,299 permanent farm workers. When fully operational the Project cotton supply chain will engage 900 cotton farms, 2,500 farm workers and 2,500 seasonal labourers in Kasbi and Nishon districts (Table 1.3).

Access to training provided by the Project raises awareness amongst contract farmers and supports improvements in labour and working conditions. As part of training on BCI principles provided in 2019 (refer to Figure 5.3 for detail) contract farmers were introduced to decent work principles and discussed such topics as legal documents in farming, labour legislation in farming and the role of Trade Unions for farmers.

During FGD 7 undertaken by the ESIA study with ten male and three female contract farmers respondents stated that new knowledge, funding provided by FE “Indorama Agro” LLC and timely payments received from the Project, facilitated efforts of the farmers in improving labour and working conditions for the farm workers and seasonal workers in their farms and provide:

- Hot meals (at the expense of contracted farms)
- Drinking water (at the expense of contracted farms)
- Rest zones for lunch breaks (at the expense of contracted farms)
- Transport (at the expense of FE “Indorama Agro” LLC)
- Medical kits, insurance and safety equipment (provided by contracted farms).

An information board with decent work principles has been installed at each contracted farm (Figure 5.2). The key focus of the information board is protecting labour rights of the farm workers. The board informs on the forced labour risk and advises anyone who feels forced to work during cotton harvesting to call the “helpline” number provided on the board and report the issue. Participants of FGD 7 confirmed that these information boards were installed in each contracted farm and that their farm workers and seasonal workers were made aware of the poster and the helpline number.

Figure 5.2: Information board with hot line number at the contracted farms

Source: FE “Indorama Agro” LLC

As of 2019, FE “Indorama Agro” LLC is the only cotton cluster that operates outside of the government support and quota system and the Company intends to introduce and implement the Sustainable Cotton Standard System (**SCSS**). This task will be accomplished as part of IFC-funded Sustainable Cotton Supply Chain Development Programme launched in Uzbekistan in 2017, The SCSS system will be based on BCI principles and will be unfolded in the direct and contract farming operations of the Company engaging all PUs.

In achieving compliance to BCI decent work principles the contracted farms will improve labour and working conditions and provide batter jobs with access to training programmes for 2,500 farm workers and 2,500 seasonal workers engaged in the contract farming scheme. The Project will extend SCSS coverage to all contract farming districts proposing a *major* **magnitude** of this beneficial impact on the cotton supply chain of the Project. Seasonal workers especially women are social receptors of *high* **sensitivity** since weeding and cotton picking are main employment opportunities and the major source of income for their families. Seasonal workers ar)e very sensitive to the risk on non-payment and any improvements in their working conditions (provision of water, hot meals, transportation, etc. Farm workers are considered to be of *medium* **sensitivity** to proposed improvements as they work in the farms permanently on a daily basis and this work is their major source of income. A formal labour contract will clearly describe the terms of engagement, working hours, wages and payment arrangement as well as dispute resolution procedure. In case of any disputes farm workers may go to court and use their labour contracts as a legal basis in protecting their labour and human rights and interests or seek protection via local labour authorities. The **beneficial impact** of human rights and labour conditions improvement results in **major significance**.

5.3.2.4 Training, Skills Improvement and Know-How Transfer

As of February 2020, the Project staff of FE “Indorama Agro” LLC includes 2,720 people (refer to Table 5.60). The proportion of staff employed from the directly and indirectly affected communities and the area makes up 96%. Local staff holds various senior and mid-level positions.

The Project is making a systematic effort in capacity building, training and knowledge transfer both for the local employees of FE “Indorama Agro” LLC and contracted farms. Capacity building programmes for local specialists in FE “Indorama Agro” LLC are undertaken with the support of international specialists, thus enabling local people to acquire necessary skills and be promoted. The Project intends to develop training programmes across various functions, including for operational staff to be able to carry out new functions (e.g., operate new machinery, plant and equipment). Employees of FE “Indorama Agro” LLC are considered to be of *medium* **sensitivity** as they already got a permanent job and are or will be receiving training in the Company.

The Project closely cooperates with the IFC Advisory team and is committed to sharing knowledge and know-how with contracted farmers. Seven training sessions were delivered to date on agronomic management practices (soil preparation, cotton varieties and seed quality, nutrient management, integrated pest management, irrigation, defoliation and harvesting, and decent work for cotton pickers) and eight field workshops held for PU agronomists and 394 farm managers (Table 5.62).

Table 5.62: Training and workshops for contracted farmers in Kasbi, 2019

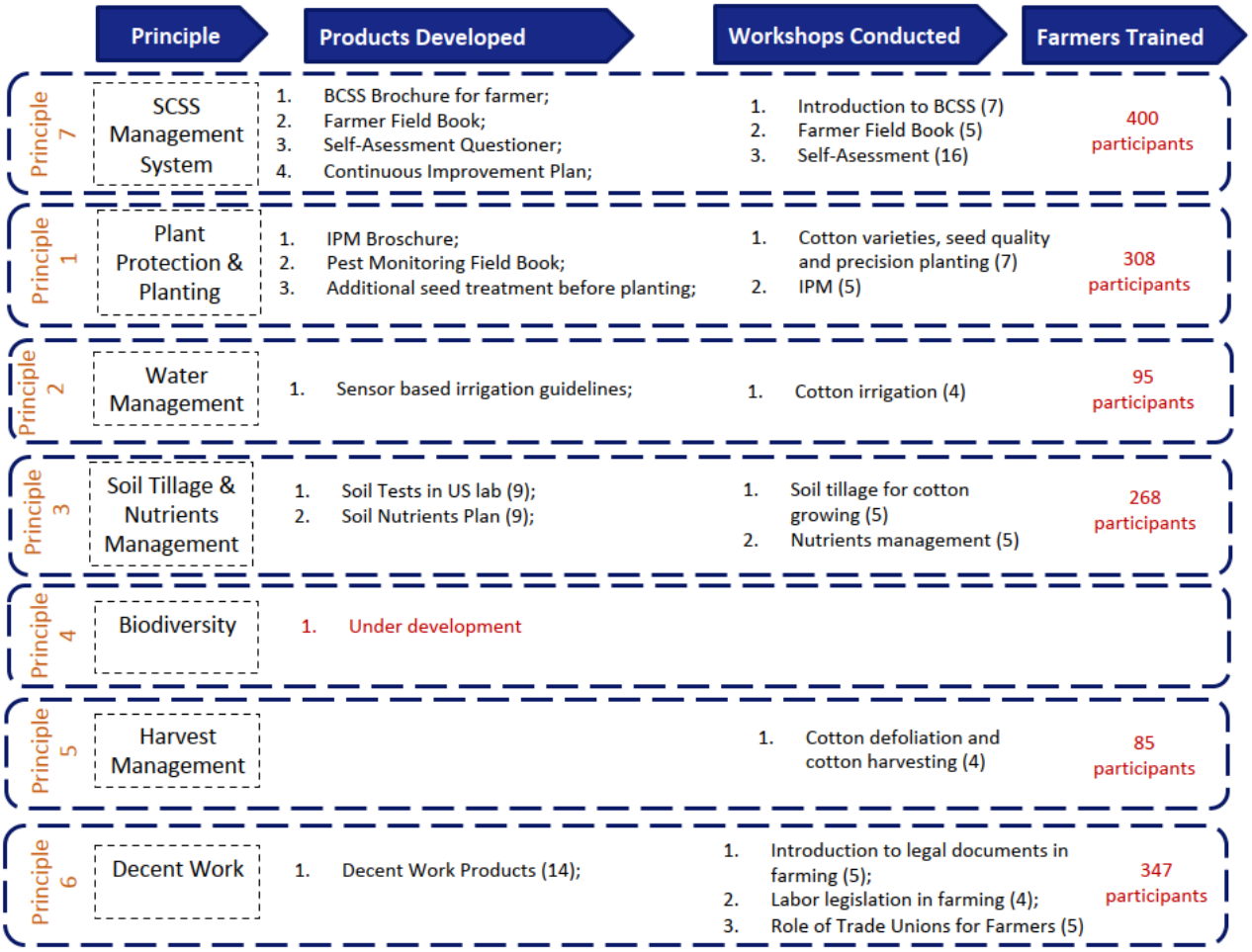
Topics	Period
Training Sessions	
Training 1: Soil tillage for cotton growing. Cotton varieties, seed quality and precision planting	March 2019
Training 2: Indorama contract farming working framework (PU structure, inputs and finance provision training, agronomic advice service and other assistance), Farmer Field Book, Continuous Improvement Plan	May 2019
Training 3: Nutrients management	May 2019
Training 4: Integrated pest management	May 2019
Training 5: Cotton irrigation	May-June 2019
Training 6: Harvest management (defoliation, harvesting)	August 2019
Training 7: Decent work principle in cotton harvesting (labour and civil contracts for farm employees and cotton pickers) (16 sessions: 4 in each PU)	July-September 2019
Workshops	
Workshop 1: Land preparation, soil tillage and soil fertility (8 sessions: 2 in each PU)	December 2018
Workshop 2: Planting	April-May, 2019
Workshop 3: Monitoring cropemergence, plant stand and pest control	May 2019
Workshop 4: Integrated pest management (16 sessions: 4 in each PU)	May-August 2019
Workshop 5: Nutrients management (monitoring and supervision of the correct and timely application of nutrients)	May-July 2019
Workshop 6: Cotton Irrigation (agronomic advice on irrigation management)	May-July 2019
Workshop 7: Evaluating cotton maturity and develop plan for defoliation and harvesting	August 2019
Workshop 8: Supervision of defoliation and harvest management	August-September 2019

Source: FE “Indorama Agro” LLC

In getting prepared to introduction of the Sustainable Cotton Standard System the Project As part of IFC-funded Sustainable Cotton Supply Chain Development Programme launched in 2017, the Company in collaboration with IFC Advisory team has developed a training programme for contract farmers and held a series of workshops on key BCI principles as depicted in Figure 5.3 below.

FGD 7 with contract farmers suggested that training sessions provided valuable knowledge on new technologies and decent work principles. Distributed guides and handouts were an advantage. Only contracted farm managers took part in the training sessions and upon completion of the training the farm managers trained their farm workers with the support of the Company’s agronomists.

Figure 5.3: BCI Principles training sessions and contract farmers trained, 2019



Source: FE “Indorama Agro” LLC

The FGD 7 with contracted farms in Kasbi district discussed changes in farming operations that resulted from the Project. All farming operations have improved. Few operations are no longer needed as farming technology changed and thus farm costs reduced. A summary is provided in the table below.

Table 5.63: Contracted farms operations, 2019

Key Operations	Change in Contracted Farms Operations after the Project
Tillage	Tillage improved: now it is deeper, better technology is applied, timely, fuel is supplied in time as well.
Planning	Funding for Fuel is provided by FE “Indorama Agro” LLC in time. Planning is now done twice where needed and improved.
Bedding	Bedding has improved as a result of deeper ploughing.
Fertilizing	Fertilizers are applied in time, good quality fertilizers from Kazakhstan are used and applied in required quantities. Fertilizing starts with planting.
Irrigation	Irrigation applied more often (in line with the new technology). Training in irrigation was provided (when and how to irrigate). More water is in the system now and less water is used as a result of improved quality of beds. There is sufficient water in the irrigation system, canals are cleaned and rehabilitated. Works completed in phases and timely
Harrowing	Not needed any more.
Seeding	Seeding now includes fertilizing and weeding (before farmers used 60 kg of seeds per 1 ha, now farmers use 17 kg per 1 ha)
Weeding	Not needed any more (harrowing, seeding and weeding are done simultaneously at UZS 90,000 + 7 L of diesel fuel per 1 ha)
Cultivation	Earlier cultivation was done in 10 rounds, now it is done in 5 rounds (UZS 90,000 per 1 round). Training in cultivation was provided, farmers have been acquainted with new techniques

Key Operations	Change in Contracted Farms Operations after the Project
Deep chiselling	Before Indorama chiselling was 45 cm deep, now it is 90 cm deep (UZS 100,000 + 10 L of diesel fuel)
Suspension	Suspension (herbicides) application – good quality of suspension, before Indorama farmers sprayed it, now a modern suspension sprayer is available in each sub-district that sprayed directly on cotton (2 L of diesel fuel per 1 ha)
Topping	Earlier topping was manual, now farmers apply only herbicides (suspension) (UZS 40,000 per 1 ha)
Defoliation	Defoliant application – this year it was of very good quality, leaves fell being green, harvesting increased by 10 times
Chopping	Chopping reduced. Earlier chipping was done in 3 passes, now it is done in 1-2 passes.
Harvesting*	Harvesting – Earlier cotton was picked manually in 5 stages, now harvesting is completed in one pass. Cotton was picked manually. Now contracted farms sign contracts with pickers and this motivated pickers to improve harvesting. First pass cost UZS 800-1,200 per 1 kg. An engagement programme was launched for pickers who may receive 1 L of oil per every 100 kg of picked cotton as a bonus.

Source: FGD with contracted farms in Kasbi, December 2019

The Project contracted farmers are considered to be of *medium* **sensitivity** to training opportunities as they are specialising in cotton farming for many years and have already acquired skills and knowledge they may rely upon and use to earn living.

The Project is committed to specifically train local women from the ACs to work as “scouts“ (assistants to the Project Agronomists) and carry out agronomic processes and breeding. There are currently 60 scouts permanently working for Indorama and there is a plan to hire a further 10, making 70 permanent positions in total. Women in the ACs are considered to be of *high* **sensitivity** to emerging training opportunities, especially when training will help them to find permanent job and earn incomes. There are currently a limited number of female jobs in the Company (3%) and largely low-skilled seasonal jobs are available for women in the rural areas. The LRP is currently under preparation to work out training details and fit the programme to the employment targets of the Company.

The **magnitude** of this impact is assessed as *minor* to *moderate* taking into account that the scope of training and skills to be built are for the cotton sector only and for people who are engaged or targeted to be engaged in the Company operations. This results in **beneficial impact of moderate significance**.

5.3.2.5 Localised Economic Development

The Project has provided to date 2,720 permanent skilled jobs in Kashkadarya and Syrdarya regions and will add up another 430 skilled jobs to run two gin plants and two residential complexes (as discussed in 5.3.2.1) providing regular incomes throughout the year to the Company’s staff and their households. The Project will also retain and improve permanent skilled jobs via contracted farms so that the total number of farm workers engaged in the Project is expected to reach 2,500 in both regions by 2021 (Table 1.3). These permanent jobs will provide a stable income for the households.

The Project intends to increase purchases from the farmers by 40% thus providing an opportunity to earn more income. All contracted farms are now receiving financing, seeds, fertilizers, advisory support and training and will be provided with machinery to harvest and transport output to the collection points. The Project will extend this advanced technical support to all new farmers.

FGD with contracted farmers was held in Kasbi district in December 2019 to understand changes that cotton farms are facing and potential for economic development. Contract farmers are positive about the implementation of the Project. The FGD respondents stated that their income and their personal business are growing. This is a result of:

- Income increased for cotton (better yields after the Project from 1,2 t/ha in 2018 up to 3-4 t/ha in 2019)
- Decreased costs of growing cotton (fertilizer, payments to seasonal workers, fuel, seeds, etc.)
- Decreased harvesting period (completed now in one stage)
- Interest free loans provided by the Company as an advance payment at 60% of the future harvest (before the Project, the Government provided similar loans, but with an annual interest of 3% in 2018 and 5% in 2019.

- Prior to the commencement of the Project, prices for cotton were set by the Government, which varied as a result of inflation, leaving contract farmers vulnerable to market fluctuations. The income which FE "Indorama Agro" LLC provides is much more stable.

FGD respondents stated that they primarily grew wheat in rotation with cotton. Now contract farmers are able to grow carrot, beans, beetroot, corn, melons, sunflowers, fodder crops planting them in the rows between wheat in the fields as rotation crops. All contract farmers operate their own equipment and machinery but have been trained by FE "Indorama Agro" LLC to apply new techniques. FGDs identified improvements in the main operations of contracted farms (Sub-section 5.3.2.4) and the farms' costs associated with these operations had decreased. The cost of operations of an average cotton farm totalled at UZS 111.50 million (USD 11,150) for a 30-ha farm or UZS 148.67 million (USD 14,872) for a 40-ha farm (excluding cost of seeds, fertilizers, defoliants and harrowing).

It means that very few cotton farms generated good profits in cotton farming before the Project with the majority of the farmers earning in average UZS 80 million (USD 8,000) a year. In this respect the Project has good potential to increase farms profits through increasing yields, improving quality of cotton fibre and provision of advisory support to the farmers on modern farming practices.

Purchase of supplies and materials, equipment, goods and various services during the operation phase will create opportunities for local businesses, especially for those who secure longer term contracts. Potential earnings during the operation phase will be available for a long-term period (of at least 49 years). Goods and services that can be procured locally include office equipment and furniture, stationaries and office supplies, catering, cleaning and laundry, vehicle maintenance, oil and fuel, fertilizers and chemicals, transportation, security, printing and photography. Restaurants and hotels in the wider AoI (Gulistan and Karshi) and within urban communities in Kasbi, Nishon, Sardoba and Oqoltyn districts are expected to benefit during Project operation as a result of increased business operations.

Local communities are considered to be of *high* **sensitive** to availability of permanent skilled jobs and the level of salaries as seasonal incomes of cotton weeding and harvesting are no longer available for their households in the Project footprint. **Local suppliers/businesses**, especially female-headed small businesses in rural areas are considered to be of *high* **sensitivity** as they are few and have less clients and thus, less opportunities to grow in rural areas if compare to businesses in urbanised and more developed parts of Uzbekistan. Mitigation measures are included in Section 5.4 and designed to enhance opportunities for local suppliers/contractors to benefit from the Project. Such measures involve inter alia actions that are targeted to provide local gender orientated development benefits including, a quota for the number or value of contracts provided to local female business owners or partners (subject to their existence) in areas such as cleaning, accommodation and catering, and contracted female farmers.

With the anticipated number of permanent skilled jobs during the operation phase and skilled jobs potentially available through the contract farmers, the impact **magnitude** is assessed to be *minor* compared to the backdrop of lost employment. The procurement of goods, equipment and services by the Project will be a beneficial impact to local businesses. The **magnitude** of this impact is considered to be *minor* based on *minor* **opportunities** for local suppliers and businesses to benefit from Project procurement opportunities. procurements Therefore, there is predicted to be a beneficial localised economic development effect of **minor to moderate significance**.

5.3.2.6 Localised Community Disturbance

Taking into account that the local AoI is located in the rural areas and the ACs traditionally use this land for farming, the Project activities in the fields will not be associated with strange or unfamiliar operations and will not disturb the perception of the rural living environment. Even though more fields will be put in operation after rehabilitation of poor condition land (1,656 ha) re-allocated to the Project, impact will be negligible since these land parcels were previously used by other farmers for cotton farming.

Noise from fields levelling, canals cleaning and reconstruction is not expected to cause any significant impact on local communities, as the activities will be conducted in or along the fields and will be temporary in nature. Temporary noise and vibration impacts are expected to arise during gin construction near Denov community (with the nearest receptor located within 116 m from the site boundary) due to excavation and piling, delivery

and movement of materials as well as construction of infrastructure and buildings, and installation of equipment (refer to Section 6.7).

The **sensitivity** of local residents to disturbance is *low* taking into account the remote nature of the construction sites and fields and low density of the rural population in the ACs. Those who are living closer to construction sites will be more vulnerable to the temporary disturbance effect with less ability to absorb the change or move away for a period of construction. Such receptors are considered to be of *medium* **sensitivity** Given the disturbance associated with the construction operations will be temporary and will last for maximum five to seven month, the overall **magnitude** is considered to be *negligible*, and the **unmitigated adverse impact** is assessed to be **negligible to minor**. Measures proposed to mitigate noise and vibration impacts during the construction phase as detailed in Section 6.7 will result in no residual impacts and no additional measures are thus required.

5.3.3 Closure and Decommissioning Phase Impacts

At the end of the operation phase the Project would need to consider an option that Project facilities might be rehabilitated or upgraded instead of decommissioning to reduce potential negative impacts to the economy, supply chain and workers. Should it be impossible, the likely social impacts resulting from the decommissioning phase of the Project that are predicted to be the most significant are identified below.

Subsequent assessment of these and other potential social impacts and effects will be required within the twelve months prior to the decommissioning phase. Section 5.4 proposes some generic mitigation measures that are likely to be required in order to offset or reduce the adverse significance of the aforementioned likely impacts and effects.

5.3.3.1 Retrenchment

Should rehabilitation of the Project facilities be impossible, the decommissioning phase may result in closure of the Project offices and plants resulting in loss of jobs and collective retrenchment

The resultant loss of employment is likely to have an adverse effect on the well-being of retrenched staff and their dependents and the significance of these effects will need to be determined immediately prior to the decommissioning phase.

5.3.3.2 Termination of Contract Farming

Closure of the plants will urge the Company to terminate Supply Contracts with the contracted farms. Termination, if finalised before the end of the cotton farming season may bring losses and result in adverse impact on contract farmers and eventually affect their farm workers. Impact significance would need to be determined prior to the decommissioning phase and mitigation proposed to avoid income and crop losses for the contract farmers.

5.3.3.3 Redundant Facilities and Unused Land

Once the Project has reached the end of its life the equipment and facilities may become redundant, and in extreme cases derelict. If not mitigated appropriately, this could potentially pose community health, safety and security risks for the people and natural resources due to unsafe equipment and/or contaminated land.

It could also lower the value of the Project area due to derelict structures.

5.3.4 Potential Risks of the Project

5.3.4.1 Risk to Workers' Health, Safety, Wellbeing and Labour Rights during Construction

Health and safety on sites remains an issue in Uzbekistan. Local contractor and sub-contractor companies are underperforming and OHS aspects are at risk of being poorly managed. Stringent monitoring will be carried out should local sub-contractors be engaged in the Project, which seems likely. An international contactor from Turkey was appointed to deliver two gin plants and two residential complexes for the Project. The contractor will apply international practises in securing occupational health and safety at sites and will be monitored by the Company against compliance with the applicable international requirements (Section 2.2) and the ESMP.

FE “Indorama Agro” LLC, being a newly established company in Uzbekistan is part of the Indorama Group with established policies in human resource management, health and safety and human rights. These policies will be adopted in the new operation as Project policies and will be applied in the contractor management process.

Project construction activities and the use of construction temporary workers’ accommodation pose potential risks to the health, safety, security and therefore well-being of construction workers if not managed appropriately.

Workers will be exposed to generic health and safety risks that are encountered by all construction projects, such as those related to facility design and the risk of structural failure, exposure to noise and vibration, traffic hazards, personal accident or injury, and others. In addition, there will be potential impacts specific to this type of project with the key hazards being:

- Movement of construction vehicles and machinery
- Works next to or near drainage channels
- Contaminated water (via temporary water supplies)
- Dusting (e.g., during earthworks and moving soils at gin sites and sites of residential complexes)
- Working at heights
- Fire and explosion hazards (use of reactive, flammable and explosive materials)
- Electrocution (e.g. from high voltage power lines in the substation to be constructed)
- Use and storage of hazardous substances (oils, lubricants, fuels and cement)
- Fugitive emissions, such as dust and vapour associated with handling and storage of some materials and waste streams
- Exposure to extreme weather conditions (sub-zero temperatures in winter and very hot temperatures in summer).

Risk of asbestos exposure is not identified for the Project.

There are also potential adverse impacts on workers related to their terms of engagement and relationship with their employer in the contractor organization. Labour-related risks may be associated with insufficient, late or non-payment of wages, overtime work, lack of contract or poor terms and conditions of the contract. There is a risk of mistreatment by management and lack of or poor management of workers’ grievances.

Health and safety impacts could result in fatality, and are therefore considered to be *medium* **magnitude** as there will not be a lot of construction workers engaged in construction, and although many may be experienced and all should be appropriately trained, the workers are at daily risk and therefore of *medium* **sensitivity**. As such, the unmitigated impact of the risk to the health, safety, security and well-being of construction workers is considered to be an **adverse impact** of **moderate significance**. Specific mitigation measures to safeguard health, safety, wellbeing and labour rights of construction workers are described in Sub-section 5.4.4. In compliance with the IFC Good Practice Note: Managing Contractors’ Environmental and Social Performance (2017), a Contractor Management Plan needs to be prepared and implemented by the Project.

5.3.4.2 Risks to Health, Safety, Security and Wellbeing of Local Communities during Construction

There are a number of activities in the construction phase which if not mitigated are likely to cause risks or disturbance to local communities. For example, construction machinery and vehicle movements will increase existing traffic flow on rural community roads and may disturb (noise and dusting) households located in the vicinity to the construction site. During construction of gin plants international staff of the contractor is expected to be transported to Project sites from Karshi and Gulistan. Increased traffic may result in road safety risks, especially in areas where there are pedestrians and cyclists on the road, livestock crossing the road as well as in busy areas and near schools. For further discussion of the traffic impacts refer to Section **6.6**. Power transmission line and substations are electrical hazards associated with potential community health and safety risks.

Generic community health and safety issues associated with the use of temporary accommodation sites include those relating to sanitation, disease, cultural alienation and fire. There will be community H&S risks

posed by the existence of construction sites and presence of security guards. The transportation, storage and use of hazardous substances all pose H&S risks which will require effective management.

Community health and safety measures will be included in the Construction Environmental and Social Management Plan (**CESMP**) addressing *inter alia* fencing of construction sites, management of chemicals to prevent harm to communities and other measures.

Local communities' **vulnerability** to health, safety, security and wellbeing impacts is considered to be *medium* because community members will have little means to exert control over potential impacts on their day to day life, and most are unlikely to have the means to make the choice to move to another area where these impacts are not present. The unmitigated **magnitude** of the risk is *moderate* because although impacts could potentially be life threatening or permanent, they are limited to the construction phase and thought to be unlikely to occur because communities do not live in the immediate vicinity to the construction sites. The unmitigated risk of impacting health, safety, security and wellbeing of local communities during the construction phase is considered to be **adverse** of **moderate significance**.

5.3.4.3 Risk of Child Labour and Forced Labour during Operation

The Project is committed to preventing any forms of child labour and forced labour in the Project supply chain or any other operations it will be dealing with. The Project has potential to contribute to international efforts in eliminating child labour and forced labour in the cotton sector of Uzbekistan through mitigation and management measures outlined in Section 5.4, however significant effort will be required to achieve this. Mechanisation of harvesting will help to address this issue. However, it will result in adverse impact of lost seasonal income on seasonal workers from communities as discussed in Sub-section 5.3.2.1.

The Project will promote decent work practices in cotton production and harvesting. The Project intends to undertake BCI certification for cotton production in 2020-2021. Principle 6 of BCI is Decent Work and its content refers to the ILO eight fundamental conventions that address the "core labour standards" which include provisions for child and forced labour. BCI respects national law and the Decent Work Principle requires that all cotton producers achieve national labour and OHS compliance with international standards prevailing when national law sets standards below the referenced international requirement.

Nevertheless, continuous large-scale seasonal employment via contract farming schemes during the harvesting season before mechanization is fully in place, poses a risk of child and forced labour to the Project based on recent reports of NGOs and human rights activists warning that forced labour still remains an issue in the cotton sector of Uzbekistan. Migrants, seasonal, public sector and sub-contracted workers and children are considered to have *high* **sensitivity** as they will be exposed to the risk of forced and child labour. With current efforts of the GoU, civil society and international community to eradicate the issues of child and forced labour in the cotton sector of Uzbekistan, the third-party monitoring missions being undertaken and engaging NGOs and private sector as well as training programmes to farmers, recruitment staff and women available via IFC, ILO and other international organisations the **magnitude** of this potential unmitigated effect will be **minor** and without mitigation the risk of child and forced labour for the Project is assessed to be **moderate**.

The Project will establish and implement a robust monitoring programme specifically during the weeding and harvesting season to make sure that child and forced labour are not associated with the Project-contracted farmers and to promote BCI-compliant sustainable cotton production practices. Such a monitoring programme is particularly important during first years of the Project operation before cotton harvesting is fully mechanised at the contracted farms.

5.3.4.4 Risk to Health and Safety, Wellbeing and Labour Rights during Operation

The main occupational health and safety risks related to the Project will be associated with the operation of the Project key components:

- Fields levelling and ploughing operations will be associated with potential impact of dust and exhaust gas emissions on operational workers similar to risks during the construction phase (also refer to Section 6.1 for air emissions)
- Mechanised application of fertilizers and pests' killers using vertical sprayers may expose operators and staff in the fields to health hazards if aerosol droplets did not reach the surface of vegetative parts of plants

or soil during spraying and these are carried away by wind to a significant distance in the fields. Handling and disposal of pesticides, fertilizers and chemicals used for cotton defoliation may risk the workers' health and safety (refer to Section 6.2 for hazardous materials impacts on soil and mitigation)

- Exposure to biological hazards via irrigation water poses a potential risk for workers who contact irrigation and drainage water that may carry biological hazards such as helminthic and acute intestinal infections (refer to Chapter 6.3 for irrigation water quality and mitigation)
- Risk of fire and explosions and OHS risks are associated with the use, transportation and storage of hazardous materials at the gin plants. Such risk may result from leaks and spills of oil and fuel in the storage tanks and during transportation (refer to Section 6.5.4 for hazardous materials management and mitigation)
- Noise and vibration hazards are associated with agricultural works and running machinery, e.g. levellers, combine harvesters and other machines used in the fields. Operational staff will be also exposed to noise from ginning machines and other equipment at the gin plants may (refer to Chapter 6.7 for noise and vibration management and mitigation)

If not mitigated appropriately through the continued development and implementation of corporate policies and procedures with sufficient OHS resources allocated and where necessary, through monitoring of sub-contractors, there are significant risks to the health and safety of the operational staff of the Company and sub-contracted workers.

In addition to OHS risks whilst working on site, there might be potential risk associated with health and safety in workers and staff accommodation. FE "Indorama Agro" LLC will allocate appropriate resources to accommodation management to avoid impacts on people living in worker accommodation provided by the Company and its contractors.

Mitigation will be included within the Project design to safeguard occupational health and safety of the Company workers and contracted workers and Project commitments on workers' rights and freedoms will be stated in the ESMMP in line with the applicable international requirements. The operational workers are considered to have *medium* **sensitivity** as they will work in proposed working conditions and be exposed to OHS risks on a daily basis under the existing OHS safeguards and protection measures in place so that actual impacts on workers are expected to be exceptional. The impact of occupational health and safety risks is considered to be of *moderate* **magnitude** because should a worker be affected the impacts are potentially life-threatening. Therefore, without mitigation, **risks to the health, safety, labour and working conditions** of operational staff are considered to be **moderate**.

5.3.4.5 Risk to Health, Safety, Security and Wellbeing of Communities during Operation

Operation of the Project may potentially pose a risk to community health and safety if not mitigated. For example, Project machinery and vehicle movements on rural community roads may disturb (noise and dusting) households located in the vicinity to the fields. During operation of gin plants international staff is expected to be transported to Project sites from residential complexes in Karshi and Gulistan. Increased traffic may result in road safety risks, especially in areas where there are pedestrians and cyclists on the road, livestock crossing the road as well as in busy areas and near schools. For further discussion of the traffic impacts refer to Section 6.6.

There will be community H&S risks posed by the existence of gin plants and machinery depots and presence of security guards. The transportation, storage and use of hazardous substances during operation are associated with H&S risks which will require effective management.

Local communities' **vulnerability** to health, safety, security and wellbeing impact is considered to be *high* because of health issues linked to polluted water and the use of toxic chemicals in the cotton industry and insufficient health care services in the rural areas. Local communities have little means to control potential health and safety risks in their daily life. The magnitude of impact is considered to be minor dur to remote location of Project sites and fields. The unmitigated risk of **impacting health, safety, security and wellbeing** of local communities during operation is considered to be adverse of **moderate significance**.

5.4 Mitigation and Enhancement Measures

5.4.1 Land Development, Preparation and Construction Phase Mitigation

5.4.1.1 Managing Land Use Changes

During the construction activities, temporary land take or temporary loss of land may take place to respond to land requirements for arranging project compounds, lay down and storage areas of construction materials, Contractor's facilities, etc. Temporary land take or loss will be avoided where possible, and where necessary it will be managed through an action plan aligned with the RPF.

In order to minimise the adverse impact of temporary land loss, the following measures will be undertaken by the Project during the construction phase:

- The Company to introduce and implement the grievance mechanism
- Contractors are to avoid as far as possible temporary land take or loss of properties from sensitive land/property users. Incorporate a contract clause with the requirement to contractors to avoid temporary land take
- Contractors to reinstate/restore the land to its pre-construction conditions (including erosion control measures, re-contouring the land, replacing the topsoil, restoration of vegetation and habitats, regaining its previous use)
- Property/asset owners will be reasonably compensated in case of any damages during construction in alignment with the RPF.

5.4.1.2 Managing Economic Displacement

In seeking compliance with the applicable international requirements, the following actions will be undertaken by the Project to mitigate land use changes, economic displacement and support livelihood restoration of the affected farmers:

- Finalise and disclose the Project Resettlement Policy Framework to guide any future land acquisition process and plan measures on livelihood restoration
- Complete a full asset survey of remaining structures and assets remaining on the land allocated to FE "Indorama Agro" LLC under Phase I land acquisition process for all Project districts to identify, agree and pay compensation to the affected farmers
- Draft, disclose, get lenders' approval and implement, a Livelihood Restoration Plan **LRP** in line with the applicable requirements The LRP includes eligibility criteria, an entitlements matrix, livelihood restoration options and a displacement oriented grievance mechanism.
- Undertake consultations with the affected owners of residual structures

Phase 2 economic displacement will need to be managed in alignment with the LRP. Should any physical displacement be required as the Project evolves, a Resettlement Action Plan (**RAP**) will be developed and implemented based on the Resettlement Policy Framework (**RPF**).

These measures will reduce **significance** of adverse social impact of economic displacement from **major** *to* **moderate** because the LRP will make the farmers affected by economic displacement less vulnerable. The magnitude of land change and loss will not change

5.4.1.3 Enhancing Temporary Employment during Construction

Temporary employment opportunities of the construction phase have been partly realised. Approximately 97% of all available temporary jobs will be offered to people from the directly affected communities (25%) and other areas in Uzbekistan (72%) including jobs for women (2%). No enhancement is feasible taking into account that the construction phase is close to completion. The key focus will be on enhancement of the operation phase employment and start as a priority action the Project will develop and disclose the Project Recruitment Policy to the ACs and local employment centres. It means however that a **beneficial effect** of temporary employment generations during construction will remain to be **minor to moderate significance**.

5.4.2 Operation Phase Mitigation

5.4.2.1 Enhancement of Employment Opportunities during Operation

The generation of local, and particularly permanent, employment and skills development opportunities have the potential to be the key benefit the Project will provide. In this respect, the key focus in recruitment will be on the unemployed women and seasonal workers who lost their incomes because of the Project as estimated in Table 5.52. The cooperation and engagement with the ACs is essential if this benefit is to be realised. In order to maximise the employment benefits to directly and indirectly affected local communities, to manage expectations and to avoid social tension that might arise in relation to perceived inequity of recruitment approaches, the Company will adopt the following measures:

- Development of a Project Recruitment Policy based on principals of non-discrimination and equal opportunities at recruitment for the Project jobs
- Inclusion in the Project Recruitment Policy a requirement to prioritise local employment ('local' will be specifically defined in the policy as people originating from directly affected ACs, and secondary priorities will be assigned to people from the wider AoI and Uzbekistan, in that order) for positions that become available.
- Inclusion in the Project Recruitment Policy of specific targets for employment and engagement of women in all aspects of farming
- Wide disclosure of the Project Recruitment Policy
- Advertising permanent and seasonal jobs availability and recruitment processes including information about required skill levels, indicative timeframes for recruitment and likely duration of contracts to provide opportunities for the vulnerable groups in the ACs (such as the unemployed, unskilled or seasonal workers) to benefit from the Project. Notification of the local employment centres in the Project districts of the available jobs to prioritise recruitment of the people in the ACs.
- Prioritise employment of women and jobless from the ACs

Should the Company adopt these measures in particular the policy to recruit people from the ACs and women, then employment generation is expected to remain a **beneficial impact of minor to moderate significance** for the operation phase because the number of jobs created will not replace those lost but will be of better quality and will promote engagement of women in skilled jobs. This may potentially reduce both the unemployment rates among women and out-migration from the local AoI among skilled workers.

5.4.2.2 Mitigating Reduction in Incomes

Change in livelihood and loss of supplementary incomes for local communities associated with the full mechanisation of cotton harvesting operations in direct farming and changes in the farming techniques and reduction of labour intensity during cotton weeding and harvesting in contract farming operations is a major adverse impact of the operation phase. An upskilling programme is essential under these circumstances targeting local communities and primarily seasonal labourers who have lost their incomes as a result of land acquisition and through mechanization of harvesting and weeding. This programme shall be designed to help impacted seasonal workers to gain the new types of employment on offer. The adverse impact of economic displacement will be mitigated in compliance with the applicable international requirements.

The following mitigation measures will be applied by the Project taking into account concerns and interests of the affected vulnerable groups (including women, seasonal workers and jobless people):

- Develop a Gender Action Plan to address employment targets for women, training for existing employees on gender-based violence and other differential impacts on women
- Assess training needs of local women and other enabling elements to avoid aspects that may form barriers for women accessing training and jobs (e.g. provision of transport, etc.)
- Develop, plan and implement an upskilling programme for women and seasonal workers in the ACs to help them to acquire or improve their skills and fill positions available in the Project. Link the upskilling programme to the recruitment needs of the Project so that loss of seasonal income is replaced as far as possible with new jobs available in the Project to provide women and seasonal workers with their own income from full-time or near full-time jobs

- Incorporate the upskilling programme in the LRP and report on its implementation as part of LRP reporting
- Develop, plan and implement a promotion programme for women already employed in the Project to enhance career opportunities for the female staff in the Company.

Community Development Programme

The Project will prepare and formalise a community development plan. The community development plan will clearly specify how it will be resourced, the source and scale of the budget for actions and implementation responsibilities.

The community development plan will include such measures as the Community Asset Programme (**CAP**) being currently implemented by the Company and supported by the IFC Advisory team. Under the CAP the Project has developed mulberry tree plantations across all ACs within the Project footprint to share Project benefits, engage more communities in the silk cocoon farming thus enabling local people to earn extra and increase their aggregate annual incomes (refer to Sub-section 4.6 for CAP details).

The Project will plan corporate social responsibility measures with a focus on addressing community issues raised during ESIA consultations and FGDs.

Implementation of these mitigation measures will target at an attempt to turn an adverse impact of livelihood changes into **negligible impact**. With the LRP mitigations and community development actions the negative effect of the major adverse impact of economic displacement may largely be reduced/nullified.

5.4.2.3 Enhancing Labour Conditions in the Project Supply Chain

Existing corporate values, policies, standards and practises of Indorama Group will be a solid foundation for managing the primary supply chain of the Project. The following measures are proposed to enhance anticipated beneficial effects of the Project:

- Develop and adopt a Human Rights Policy and incorporate commitments for respecting human rights, unacceptability of child labour and forced labour and fair treatment of employees
- Disclose the Human Rights Policy to all employees, contractors, contracted farms
- Bind contracted farms, contractors and other suppliers to comply with the provisions of the Human Rights Policy via special provisions in their contracts
- Provide labour contracts for all permanent and seasonal workers including at contracted farms
- Establish workers' grievance mechanism (to be managed by the Company) which is accessible to all Project workers, including contracted and subcontracted workers and the supply chain workforce.
- Appoint at least two Labour Officers and two Social Officers (including female officers) who will be responsible for monitoring the contractors and their sub-contractors (during the construction phase), contracted farms, including their farms' workers and seasonal workers (during operation phase) and who will link with the existing monitoring teams for contracted farms in achieving compliance with the Human Rights Policy
- Document the contracted farms human rights and labour monitoring and reporting procedure including description of assigned responsibilities, timelines and remediation process when issues are identified
- Disclose the procedure to the contracted farms and their farm workers.

5.4.2.4 Strengthening Training Opportunities, Skills and Knowledge Transfer

The Project has already launched and will continue implementation of different training programmes across various management and operational levels in the Company and for the contracted farmers. Training of gin staff will be provided to build skills of the equipment operators during the installation and commissioning by the plant supplier at the Project sites. A budget will be allocated for the training programme.

The Project will enhance training, skills and knowledge transfer through:

- Adopting a corporate Training and Mentoring Policy to sustain skills and knowledge transfer for the Project and secure skilled human resources for the lifetime of the Project

- Adopting a corporate system for personal development review, that will assess staff achievements and will allow carrier goals to be planned and supported by the management
- Establish a training centre for operators to secure a pool of skilled workers to operate Project facilities for the lifetime of the Project.

5.4.2.5 Stimulating Localised Economic Development

The Project will establish a Procurement Policy which will be formalised and documented and resources shall be allocated within the Company to implement it and undertake monitoring. The Procurement Policy will specifically include aspects covering health, safety and labour rights in the supply chain in compliance with the applicable international requirements.

A respective Procurement Procedure needs to be developed to include a requirement to disclose all procurement opportunities and advertise them locally (especially during the development/construction phase) to attract local suppliers and businesses ('local' will be specifically defined in the procedure as suppliers and businesses originating from directly affected ACs, and secondary priorities will be assigned to suppliers/businesses from the wider AoI and Uzbekistan, in that order) and allow them benefiting from the Project.

The Project will establish the following procurement practices to maximise local benefits, especially for women-headed businesses:

- Communicating future demand with anticipated timeframes
- Simplifying tender procedures so it is easier for local companies to participate
- Producing tender documents in local languages
- Holding tender workshops locally to help in understanding of need and process
- Lowering the price of tender documentation
- Making prequalification efforts match the contract type and amount
- Making price preferences for local firms
- Unbundling contracts so that local entrepreneurial services can be tapped
- Reserving a proportion of a contract value or a whole contract for local businesses to implement
- Wavering or lowering the need for performance bonds
- Instructing, through contract clauses, international contractors to engage local firms in their supply chain

The Company will set own targets for engaging female-headed business and local female staff.

Localised economic development effect may then be enhanced, resulting in **moderate beneficial impact**.

5.4.2.6 Mitigating Localised Community Disturbance

It is assumed that the mitigation measures proposed for construction will also be applied during the decommissioning or rehabilitation phases of the Project. However, it is expected that mitigation based on future knowledge and best practice will be recommended as part of any future detailed decommissioning plan.

The control of noise arising from rehabilitation works is recommended to minimise adverse impacts on occupational health and safety with noise limits set out in section 4.0 of the IFC General EHS Guidelines: Construction and Decommissioning. Specific mitigation measures during rehabilitation are summarised in Section 6.7.3.

Proposed measures to mitigate nuisance from traffic will include preparation of the Traffic Management Plan (**TMP**) to reduced safety of vulnerable road users on the local roads and residents affected by operation.

Good practice and recommended measures will allow reducing disturbance to **negligible**.

5.4.3 Decommissioning Phase Mitigation

5.4.3.1 Managing Retrenchment Planning in Decommissioning

If there are likely to be retrenchment impacts during the decommissioning phase these will need to be assessed and managed. This significance of impacts and effects must be evaluated[42]. If significant impacts and effects are predicted, a Retrenchment Plan will need to be developed by the Project to manage them.

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5.4.3.2 Managing Termination of Contract Farming

Termination of Supply Contracts is possible only after harvesting is completed and payments to contract farmers are made in full in compliance with the terms and conditions of the contracts.

5.4.3.3 Managing Residual Facilities and Unused Land

During the decommissioning phase of the Project, all Project facilities will be removed, and the land will be reclaimed without any contamination. The pre-project landscape will be restored (except for rehabilitated fields), and the land will be available for re-allocation for other users.

During the decommissioning phase the Company will make the disused sites safe (for instance, no contaminated land or redundant installations), or landscape them to allow for the amenity value of the site is at a minimum returned to its initial state or improved.

5.4.4 Mitigating Potential Risks of the Project

5.4.4.1 Health and Safety, Security and Wellbeing of Construction Workers

The following specific measures or the development of labour policies and procedures will be employed by the Company to ensure that the wellbeing of both the Company's staff and contractor workers is protected in accordance with Uzbek law, ILO core labour standards and international best practice as exemplified by EBRD PR2, IFC PS2, IFC EHS General Guidelines and EBRD/IFC guidance document on workers' accommodation:

- Working conditions and management of worker relationships:
  - Develop Workers' Code of Conduct and disclose it to all contractors
  - Introduce a clause in all contracts with the Project contractors with the requirement to achieve compliance with the Uzbek statutory labour requirements and applicable international requirements, including EBRD PR2, IFC PS2, IFC EHS General Guidelines and ILO labour requirements
  - Issue individual contracts of employment for all Project staff detailing their rights and conditions in compliance with the Uzbek Labour Code, EBRD PR2 and IFC PS2 requirements. Contracts should cover rights and obligations of the parties, hours of work, wages, overtime, compensation and benefits such as maternity or annual leave. Update the contract when material changes occur. Require through respective provisions in contracts with all (sub)contractors that they do the same
  - Monitor the contractor to have individual contracts of employment for all Project staff in line with the RoU Labour Code, EBRD PR2 and IFC PS2
  - Develop, formalise and disclose a workers' grievance mechanism (by the contractors) for complaints related to staff treatment, working or living conditions without reprisal and make these available to all Project workers, including sub-contracted staff
  - Hold toolbox talks on labour law issues and the labour grievance mechanism twice a year during the construction phase, or more frequently if necessary.

[42] Evaluation will include such factors as total number of workers, percentage of workforce, percentage of working population, characteristics of current job market, level of diversification in the local economy, secondary impacts of unemployment.

[43] Evaluation will include such factors as total number of workers, percentage of workforce, percentage of working population, characteristics of current job market, level of diversification in the local economy, secondary impacts of unemployment.

- Protecting the workforce: occupational health and safety (by the contractor):
  - Develop (by the contractor) an Occupational Health and Safety Plan which covers the hazards identified for each site, type of work and other activities such as: driving on public roads; provision of preventive and protective measures for all hazards; OHS training including how to recognise hazards, unsafe areas and occupational disease or injury; information about safe working methods including health and safety risk assessment (**HSRA**); the production of individual worksheets for discreet hazardous tasks; use of PPE; management, storage and road safety measures such as speed limits on public roads and onsite. The requirements of EBRD PR2 and IFC PS2, IFC EHS General Guidelines as well as the sector specific guidelines will be incorporated in the document
  - Require contractors through contract clauses to monitor and enforce the Occupational Health and Safety Plans
  - Maintain PPE Register and monitor use of PPE
  - Organise a training programme and maintain individual training registers for each construction worker which they can have at the end of contract for obtaining future work
  - Maintain records of all Project workers' next of kin in case of emergency
  - Registration of all accidents
  - Recording of incidents, accidents and occupational disease
  - If the risk of asbestos is identified during the construction, the Contractor shall develop an Asbestos-Containing Materials Management Plan, train staff in asbestos handling and provide PPE to protect the workers exposed to asbestos during construction.
- Human rights:
  - Develop a Project Human Rights Policy
  - Disclose Human Rights Policy to all contractors and their sub-contractors and construction workers
  - Bind contractors and sub-contractors to adhere to the Project Human Rights Policy
  - Require, through contract clauses, that contractors and sub-contractors include the provisions that prohibit discrimination of any kind, child and forced labour and promote equal opportunities for the workers
  - Supply chain reviews for child labour, forced labour and OHS issues in the contractors' organisations
- Management of contractors:
  - Advise contractors on the requirement to comply with the applicable national and international requirements for labour, health, safety and security of workers
  - The Company to employ or assign EHS Managers responsible for EHS monitoring of contractors
  - Contractors to appoint EHS Managers
  - Clauses to be inserted in contractors' agreements to ensure compliance with the following documentation and procedures:
    - Human Resources Policy and Procedures
    - Human Rights Policy
    - Recruitment Policy and Procedures
    - Grievance Mechanism
    - Worker Code of Conduct
    - Occupational Health and Safety Plan

If recommended measures are in place and implemented the risk of impacting health, safety, security and wellbeing of construction workers will be mitigated to being **minor** to **negligible**.

5.4.4.2 Health, Safety and Wellbeing of Communities during Construction

The construction phase is well in progress, so the Project will take immediate actions to ensure that recommended mitigation measures are in place. The Project will develop a Construction Environmental and Social Management Plan to incorporate and manage community health and safety during the construction period.

The CESMP will include *inter alia*:

- Security arrangements on sites including:
  - Fencing
  - Security guards, CCTV, signage / logging system to monitor entries to sites
  - Security guards checks and training in the use of force, emergency procedures and relevant equipment
  - Investigation of unlawful behaviour by security guards
- First aid kits and trained first aiders
- Fire extinguishers
- Management of chemicals and hazardous materials
- Project performance grievance mechanism.

The contractors to develop Construction Traffic Management Plan. The CTMP will be produced in accordance with applicable international standards. This plan should include at least the following mitigation measures to minimize impacts on communities:

- Measures to minimize dust
- Planning of delivery routes
- Delivery of materials and machinery to / from sites out of peak hours
- Accidental spills
- Wear and tear of road network
- Adequate maintenance of vehicles
- Mandatory adherence to speed limits.
- Measures to reduce the risk to vulnerable road users and occupants of residential properties in the vicinity of access routes (Denov community) will be identified as part of the detailed CTMP.

The CTMP will draw on international best practice in developing and ensuring the implementation of suitable strategies and will consider the option of bypassing particularly sensitive communities. Consultation will be undertaken with the affected communities and highways authority to ensure identified measures take into account local circumstances.

All these measures if properly managed and implemented will reduce potential risk to health, safety, security and wellbeing of communities to being negligible or prevented.

5.4.4.3 Preventing Child and Forced Labour during Operations

The following due diligence and mitigation measures will be carried out by the Company in preventing any forms of child and forced labour in respect of the Project:

- Develop and adopt a HR Policy and incorporate provisions for unacceptability of child and forced labour
- Bind contractors and sub-contractors to adhere to the Project HR Policy through contract clauses
- Develop Code of Conduct and disclose it to all employees, contracted farms and contractors
- Contracts with farmers, other suppliers and contractors should have specific provisions on child and forced labour and define penalties for breaches
- Ask the suppliers and contractors to share their policies on child and forced labour and verify that it includes the risk of child and forced labour and describes mitigating steps to address child and forced labour issues
- Establish an identity card system for all project workers including contracted farms' workers and keep up to date (daily) records of who is working on Project sites at any one time.
- Appoint at least two Labour Officers and two Social Officers (including female officers) who will be responsible for monitoring the contractors and their sub-contractors (during the construction phase), contracted farms, including their farms' workers and seasonal workers (during operation phase) who will link with the existing monitoring teams for contracted farms (as discussed in Sub-section 5.3.2.2) in achieving compliance with the HR Policy

- Develop a Project monitoring programme jointly with the local government, local/international NGOs and Project stakeholders to assess and monitor risks of child and forced labour during cotton harvesting (including, for example, on weekends, during school vacations or holidays)
- Actively collaborate with and participate in third-party monitoring missions during cotton harvesting
- Extend the BCI training programmes to cover all newly contracted farmers (Sub-section 5.3.2.4)
- Immediately report to the Lenders on any cases of suspected child or forced labour
- Report to local government and relevant authorities on cases of child and forced labour or any suspicions of these
- Establish a remediation process/procedure to address in any child labour and forced labour issues when these are identified
- Report to the International Lenders on monitoring findings during the harvesting period and annually on supply chain due diligence on child and forced labour as part of compulsory reporting under the Loan Agreements.

With all these measures in place and sufficient labour resources allocated to implement them **the risk of child labour and forced labour** during operation will be reduced to being **minor to negligible** or **prevented**.

5.4.4.4 Health, Safety and Workers' Wellbeing during Operations

The Project has already stated farming operations and mitigation of operational risks is an urgent priority. The following mitigation measures will be employed by the Company in safeguarding occupational health and safety as well as labour and working conditions of the operational staff and staff employed in contracted farms :

- Develop a Human Rights Policy and disclose it to all employees, contracted farms and other suppliers
- Bind contracted farms and other Project suppliers to adhere to the Project Human Rights Policy through contract clauses

In safeguarding OHS during operation the Company will:

- Introduce and implement the OHSAS 18001 management system
- Develop and implement on the corporate level an OHS Policy and Procedures (as part of OHSAS management system)
- Allocate respective OHS staff to implement OHS management system and manage OHS risks during operation
- Updated the Company's organisation structure (including branch offices) to include staff to manage OHS issues during operation
- Employ or assign a suitably qualified EHS Managers (at least two) to monitor construction projects in two Project regions
- Develop the OHS training programme and provide necessary OHS briefings
- Provide training to security staff to be employed in human rights and use of forces
- Maintain PPE Register and monitor PPE use by the Company's staff
- Encourage staff to report incidents and accidents and include toolbox talks on how to report them

In safeguarding staff accommodation during operation, the Project will prepare and implement a Workers' Accommodation Plan similar to the construction phase as discussed in Sub-section 5.4.4 above) The Accommodation Plan will be prepared for each residential complex. The Accommodation Plan is subject to approval from the International Lenders and will be submitted three months in advance of commissioning, to allow time for changes if needed.

In safeguarding labour and working conditions of the operational staff the Project will be consistent with the RoU labour law and requirements of EBRD PR2 and IFC PS2 governing labour and working conditions. This entails the Project establishing commitments on workers' rights including:

- Observing statutory labour requirements of Uzbekistan including establishment of a labour grievance mechanism and the minimum age for employment

- Ensuring acceptable conditions of work including by observing national statutory requirements related to minimum wages and hours of work
- Meeting international standards related to paying all wages, including bonuses and premium pay for overtime work, to all employees in a timely fashion and in a manner consistent with ILO Convention 95
- Commitment to ensure that all workers continue to be paid during any periodic maintenance outage periods (for instance at gin plants)
- Not taking any action to prevent employees from exercising their right of association and their right to organise and bargain collectively
- Ensuring workers are not charged fees to gain employment on the Project
- Ensuring rigorous standards for occupational health and safety are in place
- Basing employment decisions on principles of non-discrimination and equal opportunity, in particular fair and equal pay, especially for women carrying out the same work as men

The Project is committed to encourage workers to joining workers' organisations of their choosing and will support the right of workers for association and protection of their interests. This was discussed during FGDs in December 2019 and the plans of the Company to establish a Trade Union Committee was confirmed by the Company's staff.

After mitigation risks associated with health and safety, labour and working conditions during operation are expected to be **negligible** or **prevented**.

5.4.4.5 Health, Safety and Wellbeing of Communities during Operation

Measures discussed above in Sub-section 5.4.4 including the Worker Code of Conduct will entail elements for the protection of local communities. Additional specific measures will include:

- Outsourced security forces:
  - Provide adequate site security arrangements at the gin plants, commensurate with the risks posed to the safety of community members accessing the operational site.
  - Prepare a Security Management Plan for each site. The Security Management Plan will include measures to safeguard the human rights of communities, such as vetting of security guards and security arrangements at the construction sites, commensurate with the risks posed to community health and safety accessing these sites (appropriate fencing and locks to prohibit entry by members of the public at any time of day or night, provision of security services of the Project site 24 hours a day and use of CCTV cameras and signage, if possible).
  - Investigate any reports of unlawful behaviour by security guards and report to the Company management and authorities, if necessary
  - Verify that all security guards are vetted prior to recruitment to check for records of historic violence or abuse and are trained in the use of force, emergency preparedness procedures, and use of equipment with regular refresher training, which will be recorded in training logs. Security guards will be provided with uniforms and identity badges and a logging system will be used to record entry to and exit of each Project site
- Drivers and vehicles:
  - All vehicles will carry spill kits and fire extinguishers for dealing with spills or small vehicle fires on public or site roads
  - Drivers will be equipped with telephones for contacting the emergency services and the Company's head office to enact the if necessary.

The Project will develop and implement the Emergency Preparedness and Response Plan (**EPRP**) for gin plants as well as special workplace safety instructions relating to specific occupational hazards. The EPRP will include the following information:

- Overview of operational processes and risk assessment for the operational site
- List of process and area specific hazards
- Actions in case of threat or actual occurrence of accidents, and emergency situations including:

- Procedures in case of threat of major operational accidents, emergency situations and natural disasters;
- Procedures to support functioning of the forces and means engaged for emergency response and rescue operations, and to protect production process and facilities, workforce and personnel, and property;
- Emergency rescue operations to prevent immediate risks to human life and health, and to restore production process; means and forces engaged for the task;
- Liaison with local authorities, emergency panels, civil society organizations for engagement of emergency response forces and means;
- Management of the operations.

Adverse impact of vehicles on road traffic and local communities is not expected for this Project (refer to Sub-section 6.6). Should there be a significant increase in the number of machinery to be procured, the Project will develop a Traffic Management Plan or Manual for heads of transportation units. In addition, this plan will help H&S engineers in developing occupational health and safety instructions for drivers. This plan should include at least the following mitigation measures to minimize impacts on traffic and pedestrians:

- Delivery of materials, chemicals, vehicles and agricultural machinery to / from sites (fields) should be conducted out of peak hours
- Parking of vehicles along roads, within boarders of settlements and on unpaved soils (roadsides) is prohibited
- Sharp parts of vehicles moving outside fields should be removed or switched in a safe position
- Delivery routes should be planned away from settlements
- Mandatory adherence to speed limits at all times.

Identified measures will reduce the risk of potential **adverse impact** on community's health, safety and wellbeing to being **negligible adverse** or **prevented**.

5.5 Residual Impacts

Table 5.64 summarises residual social impacts and proposed mitigation/enhancement measures.

Table 5.64: Summary of residual social impacts

Activity	Potential Impact	Sensitivity	Magnitude	Significance	Mitigation/Enhancement	Residual Impact
Land Development, Preparation and Construction Phase						
Land acquisition	Land use changes and economic displacement	High	Minor	Major	• Finalise and disclose the Project Resettlement Policy Framework to guide any future land acquisition process and plan measures on livelihood restoration • Complete a full asset survey of structures and assets remaining on the land allocated to FE "Indorama Agro" LLC under Phase I land acquisition process for all Project districts to identify, agree and pay compensation to the affected farmers • Draft, and disclose, get lenders' approval and implement, a Livelihood Restoration Plan in line with the applicable requirements, including a compensation protocol The LRP includes eligibility criteria, an entitlement matrix, livelihood restoration options and a displacement-oriented grievance mechanism. • Undertake consultations with the affected owners • Phase 2 economic displacement will need to be managed in alignment with the LRP. Should any physical displacement be required as the Project evolves, a Resettlement Action Plan will be developed and implemented based on the Resettlement Policy Framework During construction: • The Company to introduce and implement the grievance mechanism • Contractors are to avoid as far as possible temporary land take or loss of properties from sensitive land/property users. Incorporate a contract clause with the requirement to contractors to avoid temporary land take • Contractors to reinstate/restore the land to its pre-construction conditions (including erosion control measures, re-contouring the land, replacing the topsoil, restoration of vegetation and habitats, regaining its previous use) • Property/asset owners will be reasonably compensated in case of any damages during construction in alignment with the RPF.	Moderate to minor adverse
Recruitment	Temporary employment generation	High	Negligible to Minor	Minor to Moderate	• Develop and disclose the Project Recruitment Policy in the ACs and local employment centres	Minor to moderate beneficial
Construction works	Risks to workers' health, safety, wellbeing and labour rights during construction	Medium	Moderate	Moderate	• Working conditions and management of worker relationships: – Develop Workers' Code of Conduct and disclose it to all contractors – Updated the contracts with the Project contractors to introduce a clause in all with the requirement to achieve compliance with the applicable international requirements, including EBRD PR2, IFC PS2, IFC EHS General Guidelines and ILO labour requirements – Issue individual contracts of employment for all Project staff detailing their rights and conditions in compliance with the Uzbek Labour Code, EBRD PR2 and IFC PS2 requirements.	Minor to negligible adverse

Activity	Potential Impact	Sensitivity	Magnitude	Significance	Mitigation/Enhancement	Residual Impact
					– Monitor the contractor to have individual contracts of employment for all Project staff in line with the RoU Labour Code, EBRD PR2 and IFC PS2 – Develop, formalise and disclose a workers' grievance mechanism (by the contractors) – Hold toolbox talks on labour law issues and the labour grievance mechanism twice a year during the construction phase, or more frequently if necessary. • Occupational health and safety: – Occupational Health and Safety Plan (by contractors) – Provisions in the contracts with (sub)contractors with the requirement to implement and monitor implementation of the Occupational Health and Safety Plans – PPE Register and use of PPE – Training programme and registers including OHS training – Personnel files to include next of kin details – Emergency Preparedness and Response Plan / Emergency Teams – Registration of all accidents – Recording of incidents, accidents and occupational disease – Supply chain review for issues of child or forced labour and OHS risks – Adequate medical facilities to be provided – first aid kits, trained first aid personnel – If the risk of asbestos is identified during the construction, the Contractor shall develop an Asbestos-Containing Materials Management Plan, train staff in asbestos handling and provide PPE to protect the workers exposed to asbestos during construction. • Human rights: – Develop a Project Human Rights Policy – Disclose Human Rights Policy to all contractors and their sub-contractors and construction workers – Bind contractors and sub-contractors to adhere to the Project Human Rights Policy – Require, through contract clauses, that contractors and sub-contractors include the provisions that prohibit discrimination of any kind, child and forced labour and promote equal opportunities for the workers – Supply chain reviews for child labour, forced labour and OHS issues in the contractors' organisations • Management of contractors: – Advise (sub)contractors on the requirement to comply with the applicable national and international requirements for labour, health, safety and security of workers – The Company to employ or assign EHS Managers responsible for EHS monitoring of contractors	

Activity	Potential Impact	Sensitivity	Magnitude	Significance	Mitigation/Enhancement	Residual Impact
					– The contractors to appoint EHS Managers – Clauses to be inserted in contractors' agreements to ensure compliance with the following documentation and procedures: ○ Human Resources Policy and Procedures ○ Human Rights Policy ○ – Recruitment Policy and Procedures ○ Grievance Mechanism ○ Worker Code of Conduct ○ Occupational Health and Safety Plan ○ Emergency Preparedness and Response Plan.	
Community Health and Safety	Risks to health, safety, security and wellbeing of communities during construction	Medium	Moderate	Moderate	• Construction Environmental and Social Action Plan • Construction Traffic Management Plan	Negligible adverse or prevented
Operation Phase						
Recruitment	Operation employment	High	Minor beneficial	Minor to moderate	• Include in the Project Recruitment Policy principals of non-discrimination and equal opportunities at recruitment for the Project jobs, • Include in the Project Recruitment Policy a requirement to prioritise local employment for positions that become available. • Include in the Project Recruitment Policy of specific targets for employment and engagement of women in all aspects of farming • Disclose the Project Recruitment Policy in the ACs • Advertise permanent and seasonal jobs opportunities and the recruitment process in the ACs via District Hokimiyats, mahallas and local employment centres • Prioritise employment of women and jobless from the ACs	Minor to moderate beneficial in the long-term outlook
Mechanisation and introduction of new farming operations	Livelihood changes during operation	High	Major	Major	• Develop a Gender Action Plan to address employment targets for women, training for existing employees on gender-based violence and other differential impacts on women • Assess training needs of local women and other enabling elements to avoid aspects that may form barriers for women accessing training and jobs (e.g. provision of transport, etc.) • Develop, plan and implement an upskilling programme for women and seasonal workers in the ACs • Incorporate the upskilling programme in the LRP and report on its implementation as part of LRP reporting • Develop, plan and implement a promotion programme for women already employed in the Project to enhance career opportunities for the female staff in the Company. Community Development Programme: • Prepare and formalise a community development plan and will make it part of the Project LRP • Plan corporate social responsibility measure with a priority focus on addressing community issues raised during ESIA consultations and FGDs.	Negligible adverse

Activity	Potential Impact	Sensitivity	Magnitude	Significance	Mitigation/Enhancement	Residual Impact
Supply chain management	Enhancing labour conditions in the Project supply chain	High	Major	Major	• Develop and adopt a Human Rights Policy and incorporate commitments for respecting human rights, unacceptability of child labour and forced labour and fair treatment of employees • Disclose the Human Rights Policy to all employees, contractors, contracted farms Bind contractors and sub-contractors to adhere to the Project HR to all employees, contracted farms and contractors • Bind contracted farms, contractors and other suppliers to comply with the provisions of the Human Rights Policy via special provisions in their contracts • Provide labour contracts for all permanent and seasonal workers including at contracted farms • Establish workers' grievance mechanism (to be managed by the Company) which is accessible to all Project workers, including contracted and subcontracted workers and the supply chain workforce. • Appoint at least two Labour Officers and two Social Officers (including female officers) who will be responsible for monitoring the contractors and their sub-contractors (during the construction phase), contracted farms, including their farms/ workers and seasonal workers (during operation phase) and who will link with the existing monitoring teams for contracted farms in achieving compliance with the Human Rights Policy • Document the contracted farms human rights and labour monitoring and reporting procedure including description of assigned responsibilities, timelines and remediation process when issues are identified • Disclose the procedure to the contracted farms and their farm workers.	Major beneficial
Capacity building	Training, skills improvement and know-how transfer	Medium to High	Minor to Moderate	Moderate	• Develop Training and Mentoring Policy • Adopt a corporate system for personal development reviews to assess staff achievements and allow carrier goals to be planned and supported by the management • Establish a training centre for operators to secure a pool of skilled workers to operate Project facilities for the lifetime of the Project	Major beneficial
Procurement of goods, works and services	Localised economic development	High	Minor	Minor to Moderate	• Develop a Project Procurement Policy and modify established practices to promote local contracting • Disclose Project Procurement Policy to suppliers and contractors Develop a Procurement Procedure • Establish the following procurement practices to maximise local benefits, especially for women-headed businesses: – Communicating future demand with anticipated timeframes – Simplifying tender procedures so it is easier for local companies to participate – Producing tender documents in local languages – Holding tender workshops locally to help in understanding of need and process – Lowering the price of tender documentation – Making prequalification efforts match the contract type and amount – Making price preferences for local firms – Unbundling contracts so that local entrepreneurial services can be tapped – Reserving a proportion of a contract value or a whole contract for local businesses to implement	Major beneficial

Activity	Potential Impact	Sensitivity	Magnitude	Significance	Mitigation/Enhancement	Residual Impact
					– Wavering or lowering the need for performance bonds – Instructing, through contract clauses, international contractors to engage local firms in their supply chain • Set Project targets for contracting female-headed business and local female staff.	
Operation activities, machinery movements and deliveries by road	Localised community disturbance	Low to Medium	Negligible	Negligible to Minor	• Preparation of the Traffic Management Plan for the operation phase (**TMP**) to reduce potential safety risks for vulnerable road users on the local roads and directly affected communities during operation associated with the Project machinery movements.	Negligible adverse
Supply Chain Management	Risk of Child and Forced Labour doting Operation	High	Minor	Moderate	• Develop and adopt a Human Resource (HR) Policy and incorporate provisions for unacceptability of child and forced labour • Bind contractors and sub-contractors to adhere to the Project HR Policy through contract clauses • Develop Code of Conduct and disclose it to all employees and contractors • Include specific provisions on child and forced labour and define penalties for breaches in contracts with farmers, other suppliers and contractors • Request the suppliers and contractors to share their policies on child and forced labour and verify that it includes the risk of child and forced labour and describes mitigating steps to address child and forced labour issues • Disclose workers' grievance mechanism to contracted farms' workers and suppliers. • Establish an identity card system for all project workers including contracted farms' workers and keep up to date (daily) records of who is working on Project sites at any one time. • Appoint at least two Labour Officers and two Social Officers (including female officers) who will be responsible for monitoring the contractors and their sub-contractors (during the construction phase), contracted farms, including their farms' workers and seasonal workers (during operation phase) and who will link with the existing monitoring teams for contracted farms in achieving compliance with the HR Policy • Develop a Project monitoring programme jointly with the local government, local/international NGOs and Project stakeholders to assess and monitor risks of child and forced labour during cotton harvesting (including, for example, on weekends, during school vacations or holidays) • Actively collaborate with and participate in third-party monitoring missions during cotton harvesting • Extend the BCI training programmes to cover all newly contracted farmers • Immediately report to the Lenders on any cases of suspected child or forced labour • Report to local government and relevant authorities on cases of child and forced labour or any suspicions of these • Establish a remediation process/procedure to address in any Child labour and forced labour issues when these are identified • Report to the International Lenders on monitoring findings during the harvesting period and annually on supply chain due diligence on child and forced labour as part of compulsory reporting under the Loan Agreements	Minor to negligible adverse or prevented

Activity	Potential Impact	Sensitivity	Magnitude	Significance	Mitigation/Enhancement	Residual Impact
Labour and Working Conditions	Risks associated with health and safety, labour and working conditions during operation	Medium	Moderate	Moderate	Human rights management: • Develop a Human Rights Policy and disclose it to all employees, contracted farms and other suppliers • Bind contracted farms and other Project suppliers to adhere to the Project Human Rights Policy OHS management: • Introduce and implement OHSAS 18001 management system • Develop and implement on the corporate level OHS Policy and Procedures (as part of OHSAS management system) • Allocate respective OHS staff to implement OHS management system and manage OHS risks during operation • Updated the Company's organisation structure (including branch offices) to include staff to manage OHS issues during operation • Employ or assign a suitably qualified EHS Managers (at least two) for each project region • Develop the OHS training programme and provide necessary OHS briefings • Provide training to security staff to be employed in human rights and use of forces • Maintain PPE Register and monitor PPE use by the Company's staff • Encourage staff to report incidents and accidents and include toolbox talks on how to report them Workers accommodation management: • Develop a Workers' Accommodation Plan for each residential complex • Approve the Workers' Accommodation Plans with the International Lenders Labour and working conditions: • Develop and adopt a Human Resource (**HR**) Policy incorporating provisions for unacceptability of child and forded labour, for non-discrimination and equal opportunities across the employment lifecycle as well as reference to the workers' grievance mechanism • Develop and adopt HR Procedures (e.g., for recruitment, motivation, assessment, training, etc). • Identify targets to employ and promote more women in the Company • Disclose HR Policy to all staff, contractors and their sub-contractors • Establish the workers' grievance mechanism by documenting the workers' grievance procedure and disclosing it to all staff • Appoint a Workers Grievance Manager in each branch office of the Company • Appoint Labour and Social Officers for monitoring labour compliance of contractors and contracted farmers Workers' rights commitments: • Observe statutory labour requirements of Uzbekistan including establishment of a labour grievance mechanism and the minimum age for employment • Ensure acceptable conditions of work including by observing national statutory requirements related to minimum wages and hours of work	Negligible adverse or prevented

Activity	Potential Impact	Sensitivity	Magnitude	Significance	Mitigation/Enhancement	Residual Impact
					• Meet international standards related to paying all wages, including bonuses and premium pay for overtime work, to all employees in a timely fashion and in a manner consistent with ILO Convention 95 • Commit to ensure that all workers continue to be paid during any periodic maintenance outage periods (for instance at gin plants) • Not take any action to prevent employees from exercising their right of association and their right to organise and bargain collectively • Ensure workers are not charged fees to gain employment on the Project • Ensure rigorous standards for occupational health and safety are in place • Base employment decisions on principles of non-discrimination and equal opportunity, in particular fair and equal pay, especially for women carrying out the same work as men	
Community Health and Safety	Risks to health, safety, security and wellbeing of communities during operation	High	Minor	Moderate	• Workers Code of Conduct • Site security arrangements • Prepare a Security Management Plan • Vetted and trained security guards • Reporting unlawful behaviour of security guards • Spill kits and fire extinguishers in all vehicles • Mobile phones with each driver to contact emergency services • Construction Environmental and Social Action Plan • Traffic Management Plan • Emergency Preparedness and Response Plan • Workplace Safety Instructions	Negligible adverse or prevented
Closure and Decommissioning Phase						
Decommissioning	Retrenchment of staff	Such a future scenario makes it difficult to produce an accurate and meaningful prediction of the significance of impacts and their effects			• Retrenchment planning • Planning of contract farming termination • Reinstatement of land and decommissioning of structures	
Reinstatement	Redundant facilities and unused land				• Gin site safe and returned to initial state or improved in terms of amenity	Too far in the future to accurately assess

5.6 Cumulative Social Impacts

There are other six cotton clusters operating in the Project wider AoI (five in Kashkadarya region and one in Syrdarya region). Jointly with the Project these clusters are mechanising cotton farming operations, promote decent working conditions for cotton pickers and offer attractive prices for cotton supply. Along with significant efforts being undertaken by the Government of Uzbekistan, civil society organisations, local activists and international community (WB and IFC, ILO, BCI, International Cotton Advisory Committee and others) in establishing sustainable cotton production practices in the cotton farming sector of the country and BCI certification of the Company in 2020-2021, the Project will contribute to a cumulative effect of solving the issue of forced labour and child labour at least Syrdarya and Kashkadarya regions of Uzbekistan .

Another cumulative effect is predicted for the Project and is associated with the sector industrialisation resulting from operation of other five clusters in the Project wider AoI, construction of processing (gins) and manufacturing (weaving, knitting and garmenting)) facilities and replacement of low-paid seasonal jobs by skilled full-time jobs in the cotton clusters and new processing and manufacturing facilities.

5.7 Proposed Monitoring and Reporting

EBRD PR1 and IFC PS1 require internal monitoring and external or independent monitoring of all Category A projects or projects with significant impacts. Monitoring reports will be disclosed by the Company every three months during development/construction, be-annually during first three years of operation and annually starting from the fourth year of operation onwards.

Monitoring of social issues will be extremely important, especially with regards to child and forced labour, other labour and working conditions issues (including remuneration and accommodation), OHS and grievances. The Project is likely to receive intense scrutiny from international NGOs which are already very concerned about labour rights breaches in the sector. Internal and external monitoring will need to ensure that the Project commitments to workers' rights are implemented, in particular to:

- Prohibition of child and forced labour
- Payment of minimum wages and overtime
- Not taking any action to prevent employees from exercising their right of association and their right to organise and bargain collectively
- Ensuring no workers are charged fees to gain employment on the Project
- Implementation of occupational health and safety plans, procedures and training
- Adherence to principles of non-discrimination and equal opportunity in the employment cycle
- Use of the labour grievance mechanism
- The existence of human resource policies, job descriptions, written contracts
- Provision of information to labour force regarding rights and working conditions
- Employee training activities.

In view of the child and forced labour issues historically associated with the cotton sector of Uzbekistan both internal and third-party monitoring of the Project (including farmers monitoring) is required to give a required level of comfort and assurance to civil society, project stakeholders and international community in general. Therefore, the Project will actively participate in third party monitoring and invite inspectors and observers to its sites to conduct audits.

Adherence to the OHS plan and procedures will be given the upmost attention and audited frequently. A warning system for violations and non-compliance will be established and implemented for the monitoring system to be effective. The Project will aim to reduce the number of accidents among Project workers to a rate of zero, especially accidents that could result in lost work time, disability, or even fatalities.

The following actions to monitor and record mitigation and enhancement measures are proposed during the construction phase and during operation (where applicable) by the Company and third parties:

- Records will be kept of people employed from ACs and their pre-project status including their employment status (were they previously employed, unemployed, underemployed, employed in informal sector, skilled,

unskilled, etc.), which village they are from, their ethnicity, their gender, their age and their start and end date of employment. Copies of job and supply chain opportunity descriptions posted in the local AoI will be kept on file

- The number of people receiving training, certificates and resultant employment on the Project from the upskilling programme will be recorded
- Records of numbers of people affected by retrenchment (as well as other data related to the retrenchment process, impacts and plan) will be kept, if relevant
- A list signatures showing that workers have received and understand their contracts and the Worker Code of Conduct will be maintained
- Grievances will be received and recorded via the workers' grievance mechanism and the log will be reviewed monthly by Company's Human Resources (HR) Departments to identify patterns or area where actions can be taken to prevent recurrent problems
- Land acquisition grievances and livelihood restoration grievance will be received and recorded via the LRP grievance mechanism and the log will be reviewed monthly by CLOs with monthly reporting to the management
- OHS training records will be maintained, especially for:
  - OHS training and hazardous work training
  - Security guards
  - Toolbox talks
  - HIV/AIDS awareness sessions
  - Emergency drills.
- Accidents, incidents and diseases logs will be maintained to monitor H&S of Project workers
- Confidential health records for Project workers will be maintained, including HIV/AIDS test results, medical results and occupational injury or disease. These records will be aggregated and made anonymous for review by external parties
- Regular site monitoring of OHS issues and PPE compliance will be carried out and recorded
- Annual monitoring of Projects risks of child and forced labour during cotton with the participation of Project stakeholders, local/international NGOs, local government and Project stakeholders and reporting to the International Lenders
- Collaboration with ILO third-party monitoring missions during harvesting
- Annual reporting on supply chain due diligence on child and forced labour as part of compulsory reporting under the Loan Agreements
- Personnel files will be kept for each worker and will include: next of kin contact details in case of accident or emergency, social security number, copy of identity card, certificates and qualifications, internal and external training, leave records, record of past abuse/criminal record for security workers.
- Payroll records will be kept
- Security records will be maintained logging entries to Project sites by non-employees and any incidents that occur with regard to security or security guards
- Community grievances will be received and recorded via the community grievance mechanism detailed within the SEP and the CLOs, as described within the SEP, will carry out analysis to identify common or recurrent problems. There will be follow-up of these issues with the Company's management and contractors to find to deal with the causes and actions to prevent further recurrence.
- There will be monitoring of community grievances by the CLO to check for complaints against security guards. These will be followed up with the relevant authorities if necessary
- Negotiations, consultations and activities under the Project LRP will be documented and kept on file to demonstrate compliance with EBRD PR5 and IFC PS5. All monitoring and reporting will be carried as detailed within the LRP instrument.
- Regular CSR reporting during the operation phase

All of the above will be regularly monitored during the construction and operation phases as appropriate by Company's EHS Managers and their teams. Monthly EHS reports will be provided to the Company's

management during the construction phase and will be made available to external monitors and auditors when required. Be-annual reporting frequency during the first three years of operation may be reduce from the fourth year of operation onwards.

6 Environmental Impact Assessment, Management and Monitoring

6.1 Air Quality

This Chapter provides an assessment of the potential impacts of the proposed Project on local air quality. This assessment has been carried out in accordance with national regulations, EU Directive on Medium Combustion Plants[44], EBRD PR 3 and PR 4, and IFC General Guidelines. It addresses the potential construction and operational phase impacts resulting from emissions to air.

6.1.1 Methodology and Assessment Criteria

6.1.1.1 Area of Influence for Air Quality

The area of influence with regard to air quality is the area that could potentially be affected by emissions during the Project construction (including construction works, excavation works and field levelling activities), operation and decommissioning. During construction and decommissioning it is a small area immediately around the construction site, fields and the main transport routes. Construction and decommissioning effects occur over a limited time period and research indicates impacts are generally experienced within 150-200 metres of the construction activity however to undertaken a conservative assessment the area of influence has been considered to be 500 metres. The operational phase effects (emissions of gas fired equipment) will be experienced throughout the life of the Project and have a potential to affect a wider area of up to two kilometres, including the area of Denov community, which is the nearest sensitive receptor to the gin plant. The closest residential property is located 160 m to the east from the site boundary.

6.1.1.2 Construction Phase

Construction, excavation works, and field levelling activities can result in temporary effects from dust. ‘Dust’ is a generic term which usually refers to particulate matter in the size range of 1-75 microns. Although no analysis of the particle composition has been undertaken, the nature of the area and activities to be carried out means that emissions of construction dust are predominantly associated with movement and handling of soil and mineral construction materials, and therefore are composed of larger fractions of this range which do not penetrate far into the respiratory system. Therefore, the primary air quality issue associated with construction phase dust emissions is normally loss of amenity and/or nuisance caused by, for example, soiling of buildings, vegetation and washing, and reduced visibility.

The first stage of the assessment involved identification of construction activities which have a potential to cause dust emissions, and magnitude of such potential without mitigation. Table 6.1 provides a generic list of potential construction activities. Selected information from this table has been used in the air quality assessment to determine the Project impact with respect to construction dust.

Table 6.1: Relevant generic dust emitting activities

Potential Dust Emitting Activities	Description	Dust Emission Potential
Soil handling, field levelling, excavation works	Can be high, depends on time of year and soil dryness	High
Excavation works on water channels	Can be low, depends on time of year and soil dryness	Low
Loading Activities	Can be high, depends on time of year and soil dryness	High
Storage of materials onsite	Can be high, depends on time of year soil dryness	High
Transport of materials within site	Can be high, depends on type of transport and road surface	High

[44] Directive (EU) 2015/2193 of the European Parliament and of the council of 25 November 2015 On the Limitation of Emissions of Certain Pollutants Into the air From Medium Combustion Plants

Potential Dust Emitting Activities	Description	Dust Emission Potential
Drilling and digging activities / soil excavation	Can be high depending on type of drilling and digging activities	High
Transport of material offsite	Generally low as transport occurs by surfaced roads	Low
Construction of new buildings	Generally low although some activities with high dust raising such as material cutting can occur	Medium-Low
Assembly of plant	Generally low as involves assembling already made pieces	Low

Source: Mott MacDonald

In the second stage of the assessment, all sensitive receptors with a potential to be significantly affected by construction dust emissions have been identified. The distances from source at which construction dust effects are felt are dependent on the extent and nature of mitigation measures, prevailing wind conditions, rainfall and the presence of natural screening by, for example, vegetation or existing physical screening such as boundary walls on a site. However, research indicates that effects from construction activities that generate dust are generally limited to within 150-200 m of the construction activity.

Receptor sensitivity is based on the types of receptors present and their distances from the construction activity. 'High' sensitivity receptors are those such as hospitals, while 'low' sensitivity receptors are those such as areas of agricultural land. Residential areas which are the highest sensitive receptors located near to the Project are considered 'medium' sensitivity.

At this stage, exact numbers of construction vehicles are not known and the routes that they will take are not defined. However, during peak construction periods the total number of vehicle movements is expected to be less than 200 per day. According to the good construction practice, less than 200 heavy goods vehicle movements during the construction phase would result in negligible changes in pollutant concentrations and therefore effects are considered not significant and have not been considered further. However, general mitigation measures to help reduce emissions have been provided in the relevant sections of this chapter.

6.1.1.3 Operational Phase

Overview

This section outlines the key pollutants and emission sources associated with the Project.

Key Pollutants

The primary emissions associated with the projects will be nitrogen oxides (NOx) from the combustion of natural gas and diesel in boiler, driers and pumps associated with the Project. Dust, including particulate matter will also be associated with the farming and processing of the cotton.

Nitrogen Oxides (NO_X)

Oxides of nitrogen is a term used to describe a mixture of nitric oxide (NO) and nitrogen dioxide (NO_2), referred to collectively as NO_x. These are primarily formed from atmospheric and fuel nitrogen as a result of high temperature combustion such as occur in vehicle engines. The proportion of each of the two forms varies depending on the combustion technology and the fuel being burnt. In areas with high motor vehicle traffic, such as in large cities, nitrogen oxides emissions can be a significant source of air pollution. NO is a colourless and tasteless gas. It is readily oxidised to NO_2, a more harmful form of NO_x by chemical reaction with ozone and other chemicals present in the atmosphere. NO_2 is a yellowish-orange to reddish-brown gas with a pungent odour. These gases contribute to formation of smog and acid rain and affect tropospheric ozone.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulates are a complex mixture of organic and inorganic substances present in the atmosphere. Some particulates occur naturally, originating from volcanoes, dust storms, forest and grassland fires, living vegetation, and sea spray. Human activities, such as burning of fossil fuels in vehicles, power plants and various industrial processes also generate significant amounts of particulates. In urban areas, road traffic is generally the greatest source of fine particulate matter, although local effects are also associated with field works, construction and demolition activity. Secondary particulates mainly sulphate, and nitrate formed by chemical reactions in the atmosphere are often classed as transboundary pollutants.

Particulates are described in term of their size; for example, the term $PM_{2.5}$ describes particulate matter that is less than 2.5 microns (10^{-6} metres) in aerodynamic diameter and PM_{10} describes particulate matter that is less than 10 microns. Fine particulates ($PM_{2.5}$ – $PM_{0.1}$) are derived mainly from gas-to-particle reactions in combustion exhausts and are predominantly of direct anthropogenic origin.

Increased levels of fine particles in the air are linked to health hazards such as heart disease, altered lung function and lung cancer. The size of particle is a main determinant of where in the respiratory tract the particle will come to rest when inhaled. Larger particles are generally filtered in the nose and throat and do not cause problems, but particulate matter smaller than about 10 micrometres, referred to as PM_{10}, can settle in bronchi and lungs and cause health problems.

Carbon Monoxide

Carbon monoxide (CO) is produced when incomplete combustion takes place. Carbon monoxide poisoning is the most common type of fatal air poisoning in many countries. Carbon monoxide is colourless, odourless, and tasteless, but highly toxic. It combines with haemoglobin to produce carboxyhaemoglobin, which usurps the space in haemoglobin that normally carries oxygen but is ineffective for delivering oxygen to bodily tissues.

Carbon monoxide is a temporary atmospheric pollutant in some urban areas, mainly from the exhaust of internal combustion engines (including vehicles, portable and back-up generators, lawn mowers, power washers, etc.), but also from incomplete combustion of various other fuels (including wood, coal, charcoal, oil, paraffin, propane, natural gas, and trash).

Emission sources

The following emission sources are included in the Project scope:

- Two gin plants, emissions from which may contain particulate matter in the form of cotton fibre and emissions from combustion plants. Project will contain one gas boiler (1 MW output), two gas seed cotton driers (4.6 MW output each), one gas mistral humidification unit (0.5 MW output) located at the gin plants will be sources of NOx and CO.
- Emissions from farming equipment exhaust gas and dust produced from earth works and harvesting, as well as fertilizers and pesticides aerosols produced during their application on fields.
- 48 mobile diesel pumps that will be used to feed distribution channels 3-4 times per year during irrigation days are sources of exhaust gas emissions such as NOx;
- Application of fertilisers and pesticides will be a potential source of hazardous aerosols during the crop care several times per season.

Assessment approach

Considering the types of emissions, the location of the Project and the minimal sensitive receptors that are located nearby the operational air quality assessment has been undertaken qualitatively.

6.1.2 Impact Assessment Criteria

6.1.2.1 Significance Criteria – Construction Phase

A combination of dust emission potential of the on-site activities (Table 6.2) and their expected duration has been used to determine the impact magnitude at the construction phase (Table 6.3).

Table 6.2: Determination of impact magnitude – construction phase

Dust Raising Potential[(a)]	Duration	Magnitude
High	Any	Major
Medium	> 3 Months	Moderate
Medium	< 3 Months	Minor
Low	Any	Negligible

Source: Mott MacDonald

Notes[(a)] Dust raising potential defined in accordance with the approach described in Section 6.1.1.2 above.

In addition, the assessment of receptor sensitivity used in the assessment has taken into account the distance it is located from the construction boundary or activity. Table 6.3 presents the criteria used for receptor sensitivity assessment.

Table 6.3: Determination of receptor sensitivity – construction phase

Receptor Classification[(a)]	Distance to Activities			
	0-50m	50-100m	100-200m	200-500m
High	High	High	Medium	Low
Medium	Medium	Medium	Low	Low
Low	Medium	Low	Low	Negligible

Source: Mott MacDonald

Notes[(a)] Receptors classified based on method described in Section 6.1.1.2 above.

Following the definition of magnitude and sensitivity, the significance of impacts and therefore overall risk of dust effects from the construction phase has been evaluated based on the significance matrix presented in Chapter 3.

6.1.2.2 Significance Criteria – Operational Phase

Gin Plants and combustion emissions

The approach for determining significance for operational air quality effects and subsequent significance has been undertaken qualitatively.

The assessment has considered the existing baseline conditions, likely emissions from the Project, taking into account incorporated mitigation such as the emissions limits that will be applicable, the location of nearby receptors and the duration that emissions sources will be operational.

Emissions of dust from growing and harvesting activities

Due to the fugitive nature of emissions of dust during field works and spraying of fertilizers and pesticides and distance to the recipients, the receptors affected can vary. The same criteria for determining receptor sensitivity as used of the construction phase has been applied.

The magnitude of dust raising activities during growing (including preparation) and harvesting has applied the same criteria applied to the construction phase.

6.1.3 Baseline Description

6.1.3.1 Background Information and Ambient Air Quality

The Hydrometeorological Service of Uzbekistan (UzHydromet) has two air monitoring stations in Syrdarya Region; both of them are located in Gulistan city, 30 km to the east of the Project area.

One station is provided in the city's industrial area, and the other one is close by a major motor road with heavy traffic, i.e. the positions are selected to provide the most accurate picture of maximum possible pollution levels of the urban air pollution. These monitoring stations being nearest to the Project site, their records of year 2018 have been used for the ESIA.

Dust	-	Annual mean concentration 0.1 mg/m^3 (0.7 MPC)	One-time maximum concentration 0.4 mg/m^3 (0.8 MPC)
Sulphur dioxide	-	Annual mean concentration within the MPC limit	One-time maximum concentration within the MPC limit
Carbon monoxide	-	Annual mean concentration 2 mg/m^3 (0.7 MPC)	One-time maximum concentration 4 mg/m^3 (0.8 MPC)
Nitrogen dioxide	-	Annual mean concentration 0.02 mg/m^3 (0.5 MPC)	One-time maximum concentration 0.02 mg/m^3 (0.5 MPC)
Nitrogen oxide	-	Annual mean concentration 0.02 mg/m^3 (0.3 MPC)	One-time maximum concentration 0.04 mg/m^3 (0.1 MPC).

According to the Report on atmospheric air quality in cities of Uzbekistan within the area covered by UzHydromet activities, the following numbers of days when daily mean concentrations exceeded the MPC limits were reported in 2018:

- Dust – 172 days
- Sulphur dioxide – 0 days
- Carbon monoxide – 0 days
- Nitrogen oxides – 0 days.

Monitoring data for the period 2014-2018 are summarised in Table 6.4.

Table 6.4: Air pollution levels in Gulistan city

Year	Concentration (mg/m^3), MPC									
	Dust	MPC daily mean	SO_2	MPC daily mean	CO	MPC daily mean	NO_2	MPC daily mean	NO	MPC daily mean
2014	0.1	0.15	0.005	0.05	1	3	0.02	0.04	0.01	0.06
2015	0.1	0.15	0.005	0.05	1	3	0.02	0.04	0.01	0.06
2016	0.1	0.15	0.006	0.05	2	3	0.02	0.04	0.02	0.06
2017	0.1	0.15	0.006	0.05	2	3	0.02	0.04	0.01	0.06
2018	0.1	0.15	0.006	0.05	2	3	0.02	0.04	0.02	0.06

Source: UzHydromet

According to UzHydromet information, the main sources of pollution in Gulistan are the Experimental Mechanical Repair Plant, Repair and Construction Department, Dairy, Canning and Fat-and-oil Extraction Mill, and Bakery.

In Kashkadarya Region, UzHydromet also has two monitoring stations, in Karshi city. One station is provided in the city's industrial area, and the other one is close by a major motor road with heavy traffic. These monitoring stations being nearest to the Project site, their records of year 2018 have been used for the ESIA.

Sulphur dioxide - Annual mean concentration 0.031 mg/m^3 (0.6 MPC) One-time maximum concentration 0.051 mg/m^3 (0.1 MPC)

Nitrogen dioxide - Annual mean concentration 0.03 mg/m^3 (0.8 MPC) One-time maximum concentration 0.05 mg/m^3 (0.6 MPC)

According to the Report on atmospheric air quality in cities of Uzbekistan within the area covered by UzHydromet activities, the following numbers of days when daily mean concentrations exceeded the MPC limits were reported in 2018:

- Sulphur dioxide – 0 days
- Nitrogen dioxide – 0 days.

Monitoring data for the period 2014-2018 are summarised in Table 6.5.

Table 6.5: Air pollution levels in Karshi city

Year	Concentration (mg/m^3), MPC			
	SO_2	MPC daily mean	NO_2	MPC daily mean
2014	0.031	0.05	0.03	0.04
2015	0.031	0.05	0.03	0.04
2016	0.031	0.05	0.03	0.04
2017	0.031	0.05	0.03	0.04
2018	0.031	0.05	0.03	0.04

Source: UzHydromet

According to UzHydromet information, the main sources of pollution in Karshi are the Expanded Clay Plant, Concrete Products Plant, Cotton and Oil Extracting Plant, and Asphalt Concrete Plant.

UzHydromet does not monitor carbon monoxide and particulate matter concentrations at the fixed monitoring stations in Karshi. The monitoring results show that levels of NO_x, CO, SO_2, are within the national limits at all of the monitoring locations. However, dust levels exceed the national standards. This is due to the naturally high levels of dust in the atmosphere.

It should be noted that the locations that the monitoring was undertaken are within existing cities where concentrations of NOx CO and SO2 would be expected to be higher than the Project sites. Nevertheless, there it is likely that particulate concentrations may still be elevated around the Project sites.

6.1.4 Assessment of Impacts

6.1.4.1 Construction Phase

Although no detailed construction methodology is available at present, the construction period is expected to last for approximately 1 year and will consist of major construction works.

Construction Activities and Associated Impact Magnitude

At this stage, no formal construction plan has been formulated for the construction of the Project. Therefore, assessment is based on generic construction activities. Typical construction activities, the dust raising potential and overall impact magnitude are presented in Table 6.6

It should be noted that construction, fields preparation and reconstruction of canals will be conducted within small sites in various parts of the Project territory. Therefore, the impact magnitude has been assessed based on tentative duration of specific activities at each site, rather than for the whole Project territory in general.

Table 6.6: Construction activities and associated impact magnitude

Section	Description of works	Key activities	Dust raising potential	Duration	Impact Magnitude
Gin site preparation, clearance and groundworks	Excavation and moving material	Earthmoving Excavation	High	< 3 months	Major
Field preparation and levelling	Excavation and moving of soils	Earthmoving Excavation	High	< 3 months	Major
Channels rehabilitation	Excavation and moving of soils	Earthmoving Excavation	Low	< 3 months	Negligible
Roads and infrastructure	Ancillary works and delivery of materials to site, removal of wastes from site	Minor excavation works. Transport of materials. Resuspension of dust on unsurfaced roads.	Low	< 3 months	Negligible
Construction of gin plants	Assembly of the main components of the plant	Storage of materials Preparation of materials (cutting etc.) Resuspension of dust on unsurfaced roads	Medium	> 3 months	Moderate
Landscaping	Landscaping requirements	Earthmoving Excavation Transport of materials Wind Resuspension of dust on unsurfaced roads	High	< 3 months	Major

Source: Mott MacDonald

The activities associated with the construction phase of the Project are considered to have a ‘High’ to ‘Low’ dust raising potential without mitigation. Taking the dust raising potential and the duration of the works into account, the magnitude of dust effects is considered to be ‘Major to ‘Negligible in accordance with the significance criteria defined in the methodology section.

Receptor Sensitivity

As described in previous sections, consideration has been given to potential receptors within 500 metres of the construction site boundary of the Project. The closest receptors to the site are residential receptors within 200 metres and therefore the receptor sensitivity is classed as 'medium'. The only receptor close by the construction site of the gin plant is Denov community. This receptor classification has been assigned to the while project area and is considered conservative.

Significance

In accordance with the significance criteria presented in Chapter 3, the risk of dust effects during the construction phase is described as 'moderate'. To reduce this effect to 'minor' or 'negligible' and therefore not significant, generic good practice dust mitigations have been presented in the mitigation section below.

6.1.4.2 Operational Phase

Impact of Gin Plants and Gas Fired Equipment

Given that national regulations of Uzbekistan for construction and operation of gin plants require that emissions are treated to completely remove cotton dust[45], and that fumes of sulphuric acid (used for treatment of cotton seeds for 2-3 months a year) will be condensed and collected, it is unlikely that potential minor emissions of cotton dust and sulphuric acid fumes will cause a significant increase in background levels of these substances in atmospheric air. Considering that in accordance with national law cotton dust emissions must be at zero, international standards are not applicable.

The Project provides for installation and operation of one small gas boiler, two gas seed cotton dryers and one gas mistral humidification unit that will run continuously only for three months of a year during cotton ginning activities. During this period there will be a maximum gas consumption of 622 m^3/h.

Although at this stage the design and specification is not finalised it would be expected that consideration is given to the IFC General EHS Guidance which required all point sources of emissions, whether "significant"' or not, should be designed according to good industry practice to avoid excessive ground level concentrations due to downwash, wakes, and eddy effects, and to ensure reasonable diffusion to minimize impacts. For projects where there are multiple sources of emissions, stack heights should be established with due consideration to emissions from all other project sources, both point and fugitive. Non-significant sources of emissions including small combustion sources also use GIIP in stack design.

In addition, for combustion sources larger than 3MWth input it would be expected that the IFC EHS emissions guidelines are met and if required EU Directive 2015/2193 for plant that are not exempt.

Considering the above, and that at this stage is estimates that total emission of all gas burning facilities in highest mode will be less than 13 kg/h of NOx and 80 kg/h of CO and effects on ambient air quality will not be significant.

The ESMP provides measures to further mitigation the potential impact.

Therefore, despite the high sensitivity of the receptor (Denov community), close to the Denov gin plant and absence of sensitive recipients near the Syrdarya gin plant (closest in 2 km to the south) impacts on magnitude of potential impact of emissions of cotton dust, sulphuric acid and of operating gas fired equipment is assessed as local, short-term and insignificant, and is not considered any further by the ESIA.

Impact of Mobile Emission Sources

Potential impact of exhaust gas emissions from cars, diesel vehicles, and mobile diesel water pumps will be limited to in proximity to fields and connection roads during fieldworks and crops watering. Total volume of diesel consumption for such vehicles estimated for the Project is 200 litres per ha annually. The exhaust emission levels from individual items is unlikely to significant, however, the Project will seek to procure modern vehicles and pumps, with improved fuel combustion together with, application of good industry practice and

[45] SanPiN "For Cotton Ginning Plants" No. 0248-08 dated 04.02.2008

mitigation measures provided under the ESIA, will reduce exhaust gas emissions compared with the current practice, so it is assessed that the impact from mobile emission source will not be significant.

Impact of dust

Potential impact of dust during the fields levelling, excavation, ploughing activities will be similar to that during the construction phase, i.e. “moderate”. To reduce this effect to ‘minor’, generic good practice dust mitigations have been presented in the mitigation section below.

Impact of Fertilizer and Pesticide Aerosols

Application of fertilizers and pesticides/herbicides in the fields will be carried out by tractors and sprinkler systems, using vertical sprayers that will dispense the working solution from 2-3m height down to the plants and soil surface. This way the working solution of aerosol will completely settle on vegetative parts of plants or on soil surface.

It is envisaged that the following pesticides will be applied by FE “Indorama Agro” LLC on direct cotton fields:

- Glyphosate – 2 – 4 l/ha (at least 3 times per year)
- Propaquizafop – 1 - 6 l/ha (1-2 times per year)
- Imidacloprid – 80 g/ha (twice per year)
- Cypermethrin + Chlorpyrifos – 2 l/ha (once per year)
- Propargite – 2 l/ha (twice per year)
- Emamectin benzoat – 350 g/ha (once per year)
- Chlorantraniliprole – 250 ml/ha (once per year)
- Mepiquat chloride – 2 l/ha (as required)

Description of properties and assessment of the potential impacts of improper handling of pesticide and fertilizer concentrates is covered in the ESIA sections “Ground and Soil Conditions” (Section 6.2) and “Materials and Waste Management” (6.5.2).

Considering the low volatility of water-based aerosols due to the big weight of droplets, it is unlikely that any aerosol droplets that did not reach to the surface of vegetative parts of plants or soil at the time of spraying would be carried by wind to a significant distance.

Given that application of fertilizers and anti-pest treatment will be conducted during short periods up to four times a year, the potential impact of fertilizer and pesticide aerosols on atmospheric air quality is assessed as insignificant. Best practice measures to further reduce the risk of potential negative impact of fertilizer and pesticide aerosols on atmospheric air quality are included in the ESMP.

6.1.4.3 Decommissioning Phase

In the event of decommissioning of the Project, it is likely that any potential air quality impacts would be similar to those experienced in the construction phase, as broadly similar activities would be required. Similar to the construction phase these are considered to be of moderate adverse significance.

6.1.4.4 Occupational Health Impacts

During application of fertilizers and pesticides by spraying of the working solutions over the soil surface, tractor drivers should observe the following safety precautions:

- During the solution spraying, stay inside the tractor cabin with closed doors and windows;
- Do not open doors and windows and do not leave the cabin until aerosol settles down on vegetative parts of plants or soil; otherwise use respiratory protection equipment;
- If equipment adjustment and contact with the solutions is needed, use chemical hands protection and respiratory protection equipment;
- In case of contact of working solutions with skin or eyes, immediately rinse the affected area of skin (eyes) with clean water, and seek medical assistance;

- In case of respiration of the aerosols, rinse nose and throat and wash face with clean water and seek medical assistance.

In all cases the magnitude of occupational health impact is assessed as major and the significance of the impact is assessed to be major.

6.1.5 Mitigation and Enhancement Measures

6.1.5.1 Construction Phase

The following mitigation measures (which are in accordance with the EHS Guidelines) for controlling air quality impacts will be incorporated for the construction phase:

- Prohibition of fields levelling, and excavation works in the vicinity of settlements in windy days to minimize dust transfer to residential areas
- Minimizing dust from material handling sources by using covers and/or control equipment (water suppression)
- Minimizing dust from open sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content
- Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements
- Manage emissions from mobile sources as per the EHS Guidelines for Air Emissions and Ambient Air Quality
- No open burning of solid waste
- Development of a dust management plan for the construction phase to minimise dust emissions.

6.1.5.2 Operational phase

All measures for prevention and minimisation of emissions from operating gin plants will be incorporated into the Project design, more specifically:

- Air aspiration and filtration systems shall ensure complete removal of cotton dust;
- Aspiration system shall ensure condensation and trapping of maximum quantity of sulphuric acid fumes from seed treatment process;
- Design and operation mode of gas fired equipment shall meet the national regulations in terms of nitrogen oxides and sulphur oxides emissions, and shall ensure minimum feasible levels of such substances in all modes of operation to meet EU Directive 2015/2193 for medium combustion plants requirements and IFC EHS guidelines as required;
- Height of the gas boilers stacks shall be designed in line with good industry practice to ensure maximum dispersion of emitted pollutants;

No further measures are required to mitigate the impact of stationary emission sources at the gin plants.

To reduce potential impact of fugitive emission sources, continuous monitoring and timely repair of fuel tanks, pipelines and locking accessories shall be provided.

Works in the fields shall be conducted with due consideration to weather conditions, including prohibition of dust-generating activities in the vicinity of settlements in windy days to minimize dust transfer to residential areas.

The above requirement also applies for spraying of fertilizer and pesticide solutions. Wind occurrence and speed should be taken into account when conducting such works near settlements.

6.1.5.3 Decommissioning phase

Specific mitigation is required to address the impact of demolishing or removing of fuel tanks and pipelines which contain hazardous materials. Appropriate mitigation will need to be established on a case by case basis depending on the location of the component, its operational use, physical state and the proximity to surface

water channels. The measures must be designed to minimise the risk of spills and to ensure that, should a spill occur, the release can be controlled and either treated or removed.

A decommissioning plan should be developed that includes the pollution control measures required for each component.

6.1.6 Residual impacts

Table 6.7 presents a summary of the residual impacts from the proposed Project.

Table 6.7: Summary of impacts

Activity	Potential Impacts	Sensitivity	Magnitude	Impact	Mitigation	Residual Impacts
Construction	Dust from construction and field levelling activities	Medium (Denov community)	Minor to moderate	Minor adverse	Mitigation measures in line with IFC guidelines, dust management plan.	Negligible
Construction and operation	Exhaust gas emission	Low	Minor	Minor adverse	Prohibition of idle running of vehicles. Avoid movements of vehicles columns across settlements. Regular monitoring of exhaust gas emissions from vehicles	Negligible
Operation	Emissions from gin plant near of Denov community	Medium	Minor	Negligible	All combustion activities to have suitable stacks. Emission sources should be supplied with adequate aspiration and filtering	Negligible
Operation	Dust from field levelling and ploughing activities	Low	Minor to moderate	Minor adverse	Mitigation measures in line with IFC guidelines, dust management plan.	Negligible to minor adverse
Operation	Emissions of fertilizers and pesticides	Low	Minor to moderate	Minor adverse	Prohibition of works in the vicinity of sensitive receptors in windy days	Negligible
Decommissioning	Dust from demolition and earth works	Low	Minor to moderate	Minor adverse	Mitigation measures in line with IFC guidelines, dust management plan.	Negligible

Source: Mott MacDonald

6.1.7 Proposed Monitoring and Reporting

Quantitative monitoring of pollution emissions from stationary sources should be conducted, and records kept of fuel consumption (natural gas, diesel, gasoline).

During the ginning period and heating season, regular monitoring of air quality shall be provided at the boundaries of gin plant sites, to identify the impact cause and devise possible measures to further reduce emissions.

6.2 Ground and Soil Conditions

6.2.1 Introduction

This Chapter considers the potential impacts to ground conditions associated with construction, operation and decommissioning of the Project. The assessment framework is set out in Chapter 3 and the assessment of potential impacts is based on the description of the Project provided in Chapter 2.

Specific objectives of the assessment are to assess:

- Potential impacts of the Project on geology and soils, from the construction phase, operation and the decommissioning phase of the Project;
- Potential impacts on geology and soils from existing contaminated land in the Project Area and future contamination as a result of the Project;
- Potential secondary impacts from these contamination sources on other sensitive receptors such as human health and environment.

As a hydrological survey for the Project has not been conducted, and the Project area is not covered by the state monitoring of ground water quality, the only source of ground water quality information for the assessment are the results of testing of drainage water samples commissioned by the Consultant. The samples testing data and assessment of the Project impact on their quality is covered in the Section 7.3 and is not further discussed in this Section.

6.2.2 Methodology and Assessment Criteria

Evaluation of Baseline Conditions

The baseline conditions of the Project site have been summarised by Mott MacDonald based on open sources and a results of soils samples tests undertaken in August 2019.

Site Reconnaissance

A reconnaissance of the Project site was undertaken in July and August 2019 by environmental consultants from Mott MacDonald. The site visit was undertaken to make a visual assessment of the baseline soil conditions at the Project site to determine the potential for future site works to impact on the existing ground conditions and soil sampling. The visit also included a review of current practices that may have negative implications for soil and groundwater quality.

Soil Quality Assessment Criteria

The IFC General EHS Guidelines (2007) require that the assessment refers to the most stringent standards of either the host county or international guidelines. Taking into account that national norms of the Republic of Uzbekistan are more stringent compared to other standards such as Canadian Environmental Quality Guidelines or Dutch Intervention Values, national requirements to the soil quality have been adopted for the ESIA to assess baseline conditions and possible Project impacts. Another reason for selecting the national standards as a source of reference is that international standards do not set the soil quality limits in terms of concentration of fertilizers and other substances regulated by the national law.

At the first stage of assessment, to address environmental and human health risks, the results of the analytical testing on soil samples have been compared to:

- Maximum Permissible Concentrations (MPC)[46] – a complex indicator of the chemical content in soil harmless to human health directly or indirectly via cultivated plants, animals and air. MPCs have been derived in the Republic of Uzbekistan for a number of compounds taking into account background exposure from the natural occurrence of pollutants in the environment.
- Sanitary guidelines to determine the extent of soil pollution[47] have been developed to establish a unified methodology of soil quality assessment for different types of soil use in the Republic of Uzbekistan.

Criteria used for the assessment are presented in Table 6.8.

Table 6.8: Soil contamination assessment criteria

Soil contamination criteria	Description of contamination	Possible use of the territory	Required soil conservation measures
Acceptable	Chemicals concentrations in soil are above the background level but within MPC	Any crop farming	Mitigation of impact of pollution sources, measures to reduce toxic agent accessibility for plants
Medium hazard	Chemicals concentrations in soil above respective MPC levels with three hazard limit levels achieved, but below the permissible translocation limit	Any crop farming, subject to quality control of agricultural plants	As above, supplemented with control of substances levels in the breathing zone and local water sources
High hazard	Chemicals concentrations in soil above respective MPC levels,	Industrial crop farming; agricultural crop farming	Category 1 measures, as well as control of toxicant concentrations in food and fodder plants Mixing food products with products

[46] SanPiN RUz No.0212-06. Sanitary rules and standards for hygienic assessment of contamination of soil in relation to various land uses, in specific circumstances of Uzbekistan

[47] SanPiN RUz No.0055-96. Maximum permissible concentrations (MPC) and approximate permissible concentrations (APC) of exogenous harmful substances in soil

Soil contamination criteria	Description of contamination	Possible use of the territory	Required soil conservation measures
	translocation hazard limit level achieved	limited considering the concentrator plants	grown on clean soil. Limited use of herbage as fodder
Extreme hazard	Chemicals concentrations in soil above MPC for all hazard limit parameters	Industrial crop farming or ban on agricultural use. Protective forest strips	Measures to reduce the level of contamination and toxicants binding in soil. Control of control of toxicants levels in the breathing zone and local water sources

Source: Mott MacDonald

The following groups of polluting substances are considered as main contaminants for agricultural soil (without detailed specification of substances):

- Nitrates
- Chlorides
- pH+
- Pesticides
- Heavy metals
- Petroleum products
- Sulphates
- Fertilizers

Determination of Impact Significance

Potential impacts of the Project on geology and soils are identified through consideration of:

- Any site investigation of land;
- Construction activities, such as ground clearance, piling and excavations;
- Operation of the Project (application of fertilizers and pesticides);
- Disposal of any potentially contaminated soils / oil during or post development;
- Decommissioning of the Project.

Based on the assessment framework set out in Chapter 3, the following section provides further information regarding the proposed methodology to determine the significance of impacts related to ground conditions. The significance of potential impacts is a function of the receptor sensitivity in relation to ground conditions, and the magnitude (duration, spatial extent, reversibility, likelihood and threshold) of the impact.

Table 6.9: Criteria for determining sensitivity

Importance / Value of Soil	Definition
High	Agricultural Land (soil of excellent quality with no limitations, can support a very wide range of agricultural crops); or nationally or internationally important for its geology.
Medium	Agricultural Land (soil of good quality with minor limitations, can support a wide range of agricultural crops); or regionally important for its geology.
Low	Agricultural Land (soil of good to moderate quality with moderate to moderately severe limitations, can sometimes support a wide range of agricultural crop, or cereals and scrubland); or locally important for its geology.
Negligible	Agricultural land (soil of poor quality with severe limitations, supports mainly scrubland), not important for its geology.

Source: Mott MacDonald

All human health receptors are considered to be of high value.

Table 6.10 presents the criteria for determining the magnitude of impacts on geology and soils.

Table 6.10: Criteria for determining magnitude of impact

Magnitude of Impact (positive or negative)	Criteria
Major Negative	Fundamental change to specific environmental conditions resulting in loss of feature. The Project (either on its own or with other projects) may result in physical removal or degradation (including loss of structure and contamination) of soil in a large area.
Moderate Negative	Detectable change to specific environmental conditions resulting in impact on integrity of feature or loss of a part of feature. Physical removal or degradation (including loss of structure and contamination) of soil in a moderate area.
Minor Negative	Detectable but minor change to specific environmental conditions resulting in minor impact on feature. The impacts result in physical removal or degradation (including loss of structure and contamination) of a minor area of soil.
Negligible	Results in an impact on feature but of insufficient magnitude to affect the use or integrity. The impact would lead to no observable change in the features.
Minor Positive	Detectable but minor change to specific environmental conditions resulting in minor positive impact on feature. Physical permanent improvement of the condition of a moderate area of soil either through remediation of soil contamination, replacement with high quality soil or removal of potential contamination source. Improved agricultural / ecological value. Or no physical improvement in soil quality but introduction of a permanent barrier to migration of contaminants preventing impacts to receptors such as groundwater, humans, etc.
Moderate Positive	Detectable change to specific environmental conditions resulting in partial recovery of feature. Physical permanent improvement of the condition of a moderate area of soil either through remediation of soil contamination, replacement with high quality soil or removal of potential contamination source. Improved agricultural / ecological value.
Major Positive	Fundamental change to specific environmental conditions resulting in complete recovery of feature. Physical permanent improvement of the condition of a large area of soil for example through remediation of soil contamination, replacement with high quality soil or removal of potential contamination source. Substantially improved agricultural / ecological value.

Source: Mott MacDonald

The magnitude of the impact and value of the features impacted are combined to determine the likely significance of each impact (see Chapter 3). The predicted effect may be modified by professional judgement. If the impact is negative then the effect is adverse, if the impact is positive then the effect is beneficial.

Assessment of Environmental Effects with Respect to Contaminated Land

The Project is located on land that, based on historical activities, has a potential to be affected by contamination. The assessment identifies and assesses the potential impacts that identified contamination risks may pose on the geology and soils sensitive receptors. Where mobilisation of contamination occurs, contamination may spread and affect a larger area and such mobilisation may have secondary impacts on human health and ecological receptors. The assessment addresses the impacts related to the existence of, and / or creation of contaminated land as a result of the construction, operation and decommissioning of the Project.

This assessment follows the standard EIA methodology for assessment of impacts from existing contamination and potential future contamination from the Project to the defined ground receptors (primarily soil and geology with consideration of secondary receptors such as human health and ecology).

6.2.3 Baseline Description

6.2.3.1 Overview of Existing Ground Conditions

The Project sites are located in two regions of Uzbekistan with developed irrigated farming, in the steppe and semi-desert zone.

All sites allocated for the Project are brownfield areas with existing or abandoned fields (layland) covered with weeds and shrubs, that are or were used for cultivation of cotton, wheat, cucurbits and other crops.

The main soil type in central are of Syrdarya Region is salinated oasis grey soil (sierozem) overlaying the alluvium and proluvium strata. Oasis grey soils have been significantly modified by irrigated farming, and the original grey desert soil structure has been completely transformed. They are characterized by large thickness and uniform brownish-grey colour. In the process of development this soil has acquired its distinct feature - strongly pronounced argillization.

Solonchaks are common in the areas with continuous capillary efflux of salt from shallow mineralized ground water horizons, where this process is not controlled by soil leaching for farming needs. Such soil accumulates large quantities of salt, especially in the top soil layer. Solonchaks develop a surface crust with salt content of 3 to 20%. Such soil contains less than 1% of humus, unless it is a secondary solonchak which may inherit humus from earlier periods of soil development.

Meadow sierozemic soils are common in the west and south of Syrdarya Region (argillaceous and loamy saline soil on alluvium and proluvium). This soil type develops due to capillary moisturization from shallow ground water horizons (most often 1-3 m). Humus content in the upper horizon is not high (1.5-2.5%).

Kashkadarya Region features light sierozem soils, as well patches of grey-brown, sandy, solonchak and meadow soils in the region's western areas. The buried channels of Kashkadarya river are covered by meadow and solonchak soil. Light sierozems are common on relatively higher elevations in the periphery of the region's flat area.

Cultivated sierozems developed in irrigated areas and cultivated meadow soils occur in the rivers' floodplains. Application of agricultural fertilizers and various land treatment operations have resulted in development of vegetable soil. Solonchaks developed in the areas where agricultural technology was not respected. Also, excessive application of mineral fertilizers (to maximize cotton yield) has had its negative effects.

All Project fields are surrounded on all sides with vast farmlands or in arable territories that are used for cattle grazing.

6.2.3.2 Project Area Geology

In absence of hydrogeological survey information from the Project area, assessment of the Project impact on quality and structure of deeper horizons and ground water is not possible at this stage. It is expected that a hydrogeological survey will be conducted for both Project sites, and potential impact on deeper horizons and ground water will be addressed by the national environmental impact assessment procedure.

Agrochemical Indicators

8 soil samples from Kashkadarya and Syrdarya regions were tested in July 2019 by the Agrochemical laboratory of the Research Institute of Soil Science and Agrochemistry of the Republic of Uzbekistan against agrochemical requirements for soils to assess soil quality in the Project area.

Table 6.11 represents the results of chemical and agrochemical analysis of the samples within the Project area.

Table 6.11: Chemical and agrochemical content of soil

Sample location	Gross %					pH
	Humus	N	C:N	P	K	
Kasbi – 1	1,250	0,081	8,1	0,420	1,405	6,24
Kasbi – 2	1,279	0,089	8,3	0,300	1,405	6,47
Nishon – 1	0,924	0,079	6,8	0,255	1,024	6,48
Nishon – 2	1,002	0,061	9,5	0,200	1,566	6,69
Oq Olitin – 1	0,942	0,080	6,8	0,255	1,024	6,88
Oq Oltin – 2	0,905	0,072	7,3	0,355	1,542	6,92
Sardoba – 1	0,941	0,090	6,1	0,275	1,024	6,93
Sardoba – 2	1,596	0,100	9,3	0,325	1,024	6,84

Source: Mott MacDonald

Studies on the chemical composition of soils demonstrate that content of humus, another component of importance for agriculture, varies across both regions. In terms of agrochemical indicators, nutrient content in tested soil samples is considered to be average.

Soil Quality

As the Project area is not covered by the state monitoring of soil quality, the Consultant analysed eight soil samples - four in each of the Project regions. To assess the influence of fertilizers, treatment and irrigation on quality of soil and its agrochemical characteristics, the samples were taken in areas with different conditions:

- Cotton fields where ploughing, irrigation, application of fertilizers, pesticides and defoliants is practiced;
- Fallow fields ploughed and left unsown for not more than one season after harvesting the crops;
- Abandoned fields (layland) left unsown for more than one season;
- Areas between fields and near canals where no irrigation is provided, and no fertilizers or pesticides are applied.

A summary of testing results is presented in Table 6.12.

Table 6.12: Results of chemical soil tests, mg/kg

Name and number of outputs	pH	Dry residue		Numerator: mg-eqv for 100g. dry ground; denominator: % to absolutely dry ground										
				Anions						Cations				
		Experimental	Calculated	NO_2^-	CO_3^{2-}	HCO_3^-	Cl^-	SO_4^{2-}	NO_3	Ca^{2+}	Mg^{2+}	NH_4^+	K^+	Na^+
							56*	16*	13*					
Kashkadarya region														
Cotton field near of UK-6	7.8	0.36	0.348	0.01	0	0.8	1.8	2.59	0.39	2.1	1.3	0.05	0.23	1.91
				0.0005	0	0.049	0.064	0.124	0.024	0.042	0.016	0.001	0.009	0.044
Near of Obi Haet Canal	6.9	0.766	0.738	0.01	0	0.8	2.8	3.96	3.39	5.2	2.5	0.17	0.46	2.63
				0.003	0	0.049	0.099	0.19	0.21	0.104	0.03	0.003	0.018	0.06
Nishob – cotton field	7.1	2.04	1.963	-	0	0.5	4.5	11.9	10.64	15.2	3.2	0.11	0.26	8.77
				0.0002	0	0.03	0.16	0.571	0.66	0.304	0.039	0.002	0.01	0.202
Nishob – fallow field	7.1	0.468	0.451	-	0	0.8	1.6	4.25	0.39	3.6	1.1	0.17	0.38	1.69
				0.002	0	0.049	0.057	0.204	0.024	0.072	0.013	0.003	0.015	0.039
Syrdarya region														
Oqoltyn – cotton field	7.5	0.248	0.239	-	0	0.7	0.5	1.47	0.95	1.9	0.9	0.08	0.15	0.59
				0.00005	0	0.043	0.018	0.071	0.059	0.038	0.011	0.002	0.006	0.013
Oqoltyn – fallow field	7.4	0.334	0.322	-	0	1	1	2.9	0.24	2.3	1.4	0.17	0.51	0.76
				0.0002	0	0.061	0.035	0.139	0.015	0.046	0.017	0.003	0.02	0.017
Sardoba – cotton field	7.2	0.294	0.283	0.01	0	0.7	0.5	2.55	0.6	2.2	1.3	0.04	0.26	0.56
				0.0005	0	0.043	0.018	0.123	0.037	0.044	0.016	0.001	0.01	0.013
Sardoba – fallow field	6.8	3.88	3.731	0.01	0	1	10	47.75	0.06	13.5	26	0.08	1.2	18.03
				0.0005	0	0.061	0.355	2.292	0.004	0.27	0.316	0.002	0.047	0.415

Source: Mott MacDonald

* MPC as per SanPiN RUz No. 0055-96. Maximum permissible concentrations (MPC) and approximate permissible concentrations (APC) of exogenous harmful substances in soil

Failure of MPC standard

Table 6.13: Results of chemical soil tests (petroleum products), g/kg

Place of selection	Petroleum products (g/kg)	Maximum permissible concentration, g/kg
Cotton field near of UK-6	0.018	0.1
Near of Obi Haet Channel	0.618	0.1
Nishob – cotton field	0.038	0.1
Nishob – fallow field	0.102	0.1
Oqoltyn – cotton field	0.028	0.1
Oqoltyn – fallow field	0.058	0.1
Sardoba – cotton field	0.148	0.1
Sardoba – fallow field	0.248	0.1

Source: Mott MacDonald

The analysis of the parameters regulated by national law shows that only one soil sample from layland in Syrdarya Region contained sulphates in concentrations above the permissible limit. Elevated levels of ions of magnesium, sodium and chlorine in the same sample indicate that either the field is contaminated due to foliar application of magnesium sulphate, or the substance migrated vertically from ground water, and that salt content in local soil is fairly high.

In terms of petroleum products content in soil, the above table demonstrates that limit level for this parameter was exceeded in multiple samples, irrespective of the land use. Notably, contamination level in sample taken at the field edge near Obi Haet Canal exceeded MPC sixfold.

Therefore, “permissible” and “medium hazard” category can be assigned to soil in the Project sites, in accordance with the national categorization methodology.

Considering the fairly low levels of main soil pollutants on the existing and abandoned fields, and that the same substances were detected in drainage water samples in high concentrations, often above MPC, one may suggest that plants vital activity, good permeability of soil, and irrigation of the area do not support accumulation of fertilizers in soil.

6.2.3.3 Historic and Potential Future Contamination Sources

Development of Syrdarya Region of Uzbekistan (Golodnaya or “Starving” Steppe) started in late 19th century when this area was integrated into the Russian Empire. Construction of irrigation canals in Golodnaya Steppe was initiated before the World War I. However, this land was actually drawn into economic circulation only during the Soviet Era (1918) when about 500 ha of land was allocated for crop farming. Multiple irrigation and land development projects were implemented which included construction of dams, administrative, public, housing facilities. In 1956 a part of the Starving Steppe area was transferred from Kazakh SSR to Uzbek SSR, to concentrate cotton farming in one republic. Irrigation of vast areas in the Starving Steppe was achieved as a result of construction of the Central, South Golodnaya Steppe and other canals in 1950-1960s. Thus, the arid desert turned into a major cotton growing area.

Development of Karshi steppe (Kashkadarya Region) - a plain area at the foot of Zarafshan and Gissar ridges started during the Soviet Era, in 1960-1970s. Irrigation water is transported to Karshi steppe from Kashkadarya river by the Karshi canal. Significant areas are used for cereal crops and cotton farming.

In view of the plans of Uzbekistan Government for rehabilitation and development of agriculture and cotton farming, it is likely that impact on soil will increase as abandoned fields are re-cultivated and new areas are drawn into farming activities.

6.2.4 Assessment of Impacts

6.2.4.1 Construction Phase

Historical Contamination and Degradation of Soil

The potential impact of historical pollution with fertilizers and petroleum products and of the high mineral salt content is expected to be moderate positive, as ploughing and leaching of soil with medium sensitivity will improve the soil structure and permeability and will support washing-out of the accumulated pollutants by drainage water.

Area preparation for construction of infrastructure facilities and gin plant buildings will result in overturning of top soil and has a potential to disturb underground reservoirs, metal elements and pipelines which may be present underground, and cause contamination of currently unpolluted soil horizons. Furthermore, unpolluted soil may be exposed to contamination in case of incorrect storage of excavated contaminated ground. Therefore, considering the low sensitivity of the receptor, magnitude of potential impact on soil at the gin plants construction sites can be assessed as minor negative.

Contamination of Soil

During construction, a range of potentially hazardous substances would be used, such as oils, lubricants, fuels, and cement. These materials will also require transport to the site. Accidental spills or leaks of hazardous substances may result in local contamination of soils, with potential implications for groundwater. However, with modern site management the probability is considered low enough as to present an insignificant risk.

Considering the moderate value of soils in the Project area and excluding gin construction sites, the impact on soil is are assessed as moderate positive.

6.2.4.2 Operation Phase

Storage, Transport and Use of Hazardous Materials

Similarly, to the construction phase, the main potential contamination impacts for the Project are associated with the use, transport and storage of hazardous materials, and disposal of pesticides and fertilizers residues. Pollutants associated with the Project activities include oil, fuels, pesticides, fertilizers, and other chemicals related to the plants care, such as those for cotton defoliation. Impacts may result from leaks and spills from the storage tanks, losses during transportation, usage of excessive volumes of chemicals during plant care activities and inappropriate disposal of residues.

The Company will use the following substances for tending cotton and other crops:

Glyphosate ($C_3H_8NO_5P$)

Glyphosate (CAS No.1071-83-6) is a broad-spectrum systemic herbicide and crop desiccant. It is an organophosphorus compound, specifically a phosphonate, which acts by inhibiting the plant enzyme 5-enolpyruvylshikimate-3-phosphate synthase. It is used to kill weeds, especially annual broadleaf weeds and grasses that compete with crops. Glyphosate is one of the most used herbicides in the agricultural sector and in home and garden, government and industry, and commercial applications.

World Health Organization's International Agency for Research on Cancer (**IARC**) classified glyphosate as "probably carcinogenic in humans" based on epidemiological studies, animal studies, and in vitro studies[48]. The European Chemicals Agency (**ECHA**) classified glyphosate as causing serious eye damage and toxic to aquatic life, but not toxic[49] for human health.

Propaquizafop ($C_{22}H_{22}ClN_3O_5$)

Propaquizafop (CAS No.111479-05-1[50]) is quickly adsorbed by weeds and affects grass cell tissues, inhibits fatty acids formation, and disrupts cell functions. Absorption into plants takes less than an hour. Weeds stop growing in 1-2 hours after spray application and die out within 15-20 days.

[48] https://monographs.iarc.fr/list-of-classifications

[49] Toxicology data network https://chem.nlm.nih.gov/chemidplus/rn/1071-83-6

[50] Toxicology data network https://chem.nlm.nih.gov/chemidplus/name/propaquizafop

Imidacloprid ($C_9H_{10}ClN_5O_2$)

Imidacloprid (CAS No.138261-41-3[51]) is a systemic insecticide that acts as an insect neurotoxin and belongs to a class of chemicals called the neonicotinoids which act on the central nervous system of insects. Imidacloprid is the most widely used insecticide in the world. The chemical works by interfering with the transmission of stimuli in the insect nervous system. Specifically, it causes a blockage of the nicotinergic neuronal pathway. By blocking nicotinic acetylcholine receptors, imidacloprid prevents acetylcholine from transmitting impulses between nerves, resulting in the insect's paralysis and eventual death. It is effective on contact and via stomach action. Because imidacloprid binds much more strongly to insect neuron receptors than to mammal neuron receptors, this insecticide is more toxic to insects than to mammals.

Based on laboratory rat studies, imidacloprid is rated as "moderately toxic" on an acute oral basis to mammals and low toxicity on a dermal basis by the World Health Organization and the United States Environmental Protection Agency (class II or III, requiring a "Warning" or "Caution" label).

Cypermethrin ($C_{22}H_{19}Cl_2NO_3$)

Cypermethrin (CAS No.52315-07-8[52]) is a synthetic pyrethroid used as an insecticide in large-scale commercial agricultural applications as well as in consumer products for domestic purposes (ant and cockroach killers, including Raid, Ortho, Combat, and ant chalk). It behaves as a fast-acting neurotoxin in insects. It is easily degraded on soil and plants but can be effective for weeks when applied to indoor inert surfaces. Exposure to sunlight, water and oxygen will accelerate its decomposition. Cypermethrin is highly toxic to fish, bees and aquatic insects.

Cypermethrin is moderately toxic through skin contact or ingestion. It may cause irritation to the skin and eyes. Symptoms of dermal exposure include numbness, tingling, itching, burning sensation, loss of bladder control, incoordination, seizures and possible death. Pyrethroids may adversely affect the central nervous system.

Chlorpyrifos ($C_9H_{11}Cl_3NO_3PS$)

Chlorpyrifos (CAS No.2921-88-2[53]) is an organophosphate pesticide used on crops, animals, and buildings, and in other settings, to kill a number of pests, including insects and worms. In agriculture, it is one of the most widely used organophosphate insecticides. It acts on the nervous systems of insects by inhibiting the acetylcholinesterase enzyme. Chlorpyrifos is considered moderately hazardous to humans by the World Health Organization based on its acute toxicity[54]. Exposure surpassing recommended levels is linked to neurological effects, persistent developmental disorders, and autoimmune disorders. Exposure during pregnancy may harm the mental development of children.

Propargite ($C_{19}H_{26}O_4S$)

Propargite (CAS No.2312-35-8[55]) is a pesticide used to kill mites (an acaricide). Symptoms of excessive exposure are eye and skin irritation, and possibly sensitization. It is highly toxic to amphibians, fish, and zooplankton, as well as having potential carcinogenity[56].

Emamectin benzoat ($C_{56}H_{81}NO_{15}$)

Emamectin (CAS No.155569-91-8[57]) is widely used in controlling lepidopterous pests (order of insects that as larvae are caterpillars and as adults have four broad wings including butterflies, moths, and skippers) in agricultural products. The low-application rate of the active ingredient needed and broad-spectrum applicability as an insecticide has gained emamectin significant popularity among farmers.

Chlorantraniliprole ($C_{18}H_{14}BrCl_2N_5O_2$)

Chlorantraniliprole (CAS No.500008-45-7[58]) is an insecticide of the ryanoid class. Chlorantraniliprole is being developed worldwide to a new class of selective insecticides featuring a novel mode of action to control a range of pests belonging to the order Lepidoptera and some other Coleoptera, Diptera and Isoptera species.

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51 Toxicology data network https://chem.nlm.nih.gov/chemidplus/name/imidacloprid
52 Toxicology data network https://chem.nlm.nih.gov/chemidplus/name/cypermethrin
53 Toxicology data network https://chem.nlm.nih.gov/chemidplus/name/chlorpyrifos
54 https://www.who.int/ipcs/publications/pesticides_hazard/en/
55 Toxicology data network https://chem.nlm.nih.gov/chemidplus/name/propargite
56 https://nepis.epa.gov/Exe/ZyPDF.cgi/91024KUP.PDF?Dockey=91024KUP.PDF
57 Toxicology data network https://chem.nlm.nih.gov/chemidplus/name/emamectin%20benzoate
58 Toxicology data network https://chem.nlm.nih.gov/chemidplus/rn/500008-45-7

Chlorantraniliprole activates Ryanodine receptor via stimulation of the release of calcium stores from the Sarcoplasmic reticulum of muscle cells (i.e. for chewing insect pest) causing impaired regulation, paralysis and ultimately death of sensitive species. The differential selectivity of chlorantraniliprole had towards insect rynodine receptors explained the outstanding profile of low mammalian toxicity. Chlorantraniliprole is active on chewing pest insects primarily by ingestion and secondarily by contact.

Mepiquat chloride ($C_7H_{16}ClN$)

Mepiquat chloride (CAS No.24307-26-4[59]) is a quaternary ammonium salt consisting of equimolar amounts of mepiquat cations and chloride anions. A plant growth regulator, it is used in agriculture to reduce vegetative growth. It has a role as a plant growth retardant and an agrochemical.

Tentative rates for application of pesticides on FE “Indorama Agro” LLC direct cotton fields:

- Glyphosate – 2 – 4 l/ha (at least 3 times)
- Propaquizafop – 1 - 6 l/ha (1-2 times)
- Imidacloprid – 80 g/ha (twice)
- Cypermethrin + Chlorpyrifos – 2 l/ha (once)
- Propargite – 2 l/ha (twice)
- Emamectin benzoat – 350 g/ha (once)
- Chlorantraniliprole – 250 ml/ha (once)
- Mepiquat chloride – 2 l/ha (as required)

FE “Indorama Agro” LLC should apply measures stated in the EBRD PR 3 paras 24, 25, 26, and IFC PS3 para 17. Farm service yards and workshops, as well as operational sites of FE “Indorama Agro” LLC will also use other hazardous materials and generate hazardous wastes, such as paint, mercury lamps, oily wastes and waste oils, waste pesticides and fertilizers.

Much of the chemicals used by the Project are water soluble and highly mobile and can potentially contaminate a large area. Without mitigation chemicals in groundwater may migrate laterally, presenting risks to groundwater resources further afield. Some liquids may also migrate vertically in groundwater presenting a risk to deeper aquifers.

Detailed design of the project facilities is not complete to the date and potential for soil contamination cannot be assessed adequately. By the information received from Indorama, gin plants and vehicles depots will be provided with storage facilities for oil products and agrochemicals in line with national regulations, i.e. all hazardous materials will be stored in bunded areas or containers or on lined surfaces with surface drainage to a wastewater treatment system.

Contamination has a potential to affect soil quality locally at the gin plant sites and across the wider area of fields. Soil is considered to be a low or negligible to low value receptor. Based on its low value, the significance of impacts to soil is assessed as insignificant.

Storage and handling of hazardous materials onsite will be undertaken in accordance with the site environmental health and safety plan to minimise the risk of leaks and spills and therefore the potential for impacts to the environment and human health.

If not suitably controlled, soil contamination has a potential to impact groundwater and ecology. The most likely receptors include site operatives and visitors and taking into account the potential impact to human health, the significance of this effect is assessed as minor without mitigation.

6.2.5 Mitigation Measures

The main impacts on soil for all aspects and phases of the Project are considered to be erosion caused by uncontrolled water streams during irrigation, disturbance of the physical, chemical and biological properties of soil (particularly the more valuable topsoil), and contamination. This is particularly significant during the early construction phase when ground disturbance, leaks and spills are more likely.

[59] Toxicology data network https://chem.nlm.nih.gov/chemidplus/name/mepiquat%20chloride

Contamination impacts from leaks and spills will be mitigated through use of best practice construction methodology in line with local regulations and good practice. Impacts from waste can be suitably mitigated by following a project-specific waste management plan. Contamination from excessive application of defoliants, pesticides and fertilizers will be managed through the strict instructions on preparation of solutions of fertilizers, pesticides and other agrochemicals, and accurate identification of crops needs. For all aspects of the Project a comprehensive Health, Safety and Environment Plan should be implemented, aimed at preventing accidents, injuries and work-related diseases through the identification of the causes of physical, chemical and biological hazards and by prioritising hazard elimination, hazard control and hazard minimisation.

The mitigation measures identified below are incorporated into the following sections of the assessment to identify any residual impacts after mitigation.

Mitigation of Risks to Workers Health

Measures for protection of workers health include:

- Making the workers aware of potential hazards;
- Safe storage of hazardous materials;
- Provision of suitable ventilation system in workers accommodation;
- Provision of suitable welfare facilities including clean water for hand and face washing and drinking;
- Environmental monitoring and emergency preparedness and response plans in line with national requirements, etc.

An Emergency Response Plan will be prepared in strict compliance with national regulations as it is required to prevent fire and explosions at cotton gins.

Chemical hazards should be controlled in line with national requirements and safety data sheets provided by chemical producers. As well as, safety control measures will be based on the requirements of EBRD RP4 and Seveso III Directive[60].

Control safety measures should be implemented via safety action plans, safety data sheets for each chemical (as part of FE “Indorama Agro” LLC Crop Protection Plan and Fertilizers Application Annual Plan) including methods of safe storage, handling, and application, safety measures for different professions, list of personal protection equipment, emergency response measures, first aid arrangements.

Impacts to workers’ health also can be prevented by use of appropriate PPE in accordance with the IFC EHS General Guidelines (2007). Suitable PPE includes: eye protection; hand protection, and lung protection.

Physical exposure to contaminated soil and dust during field works and construction can result in a risk to site workers. Good site practice and appropriate use of PPE in line with national requirements and the IFC EHS General Guidelines will be maintained during construction and field levelling works. Such requirements should be reviewed on a regular basis and PPE should be maintained and replaced when worn out. Occupational monitoring of workers will be undertaken in order to confirm the effectiveness of use of PPE, and the PPE requirements will be revised as needed.

Construction Mitigation Requirements

A Construction Environmental Management Plan (**CEMP**) will be developed for the site prior to construction, in order to minimise respective environmental impacts. The CEMP will incorporate measures as required by national regulations and good practice, including those set out in IFC EHS General Guidelines.

Mitigation measures required during the construction of the Project are summarised in Table 6.14 below:

Table 6.14: Mitigation measures required during the construction phase

Process/Activity	Impact	Mitigation
Earthworks / intrusive	Mobilisation of dust and secondary impacts on workers’ health	Use best practice construction methodology in line with local regulations and good practice.

[60] Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the Control of Major-accident Hazards Involving Dangerous Substances

Process/Activity	Impact	Mitigation
construction works / field levelling	If present, disturbance of existing historic soil contamination	Undertake earthworks during suitable weather conditions i.e. low wind to minimise the level of windblown dust, which may be potentially contaminated. Contractors to wear suitable PPE to protect against inhalation of dust. A risk assessment will be carried out to identify the level of PPE required in line with site specific risk factors. Use 'damping down' measures during excavation and movement of contaminated soils if any to prevent dust migration.
	Uncover contaminated soils that may present a risk to workers health or the environment if left in place, or if removed and not suitably handled and disposed.	The presence of contamination will be assessed, and any clean-up will be conducted as part of the construction works. In all cases where contamination is identified in soils, risk assessment will be undertaken to determine if remediation is required. Guidance regarding the correct procedure for storage, handling and disposal of contaminated soils will be detailed in the CEMP.
Leaks and spills of Hazardous Materials	Soil quality with secondary impacts on groundwater quality and human health.	Use best practice construction methodology in line with local regulations and good practice. Hazardous materials will be suitably stored to prevent leaks and spills. Drip trays will be used to intercept leaks and spills from equipment and during refuelling. Adequate bunding will be provided for all fuel and chemical storage.

Source: Mott MacDonald

There is a potential for impacts to the health of contractors and site workers during construction activities when handling hazardous wastes and materials. A comprehensive Occupational Health and Safety Plan will be developed aimed at preventing accidents, injuries and work-related diseases through the identification of the causes of physical, chemical, biological and radiological hazards and by prioritising hazard elimination, hazard control and hazard minimisation.

Operation Mitigation Requirements

Mitigation measures required for operation of the Project are summarised in Table 6.15 below:

Table 6.15: Mitigation measures required during the operation phase

Process / Activity	Impact	Mitigation
Leaks and spills of Hazardous Materials	Soil quality with secondary impacts on groundwater quality and human health.	Use best practice in line with local regulations and good practice for operation of the Project. Drip trays will be used to intercept leaks and spills from equipment and during refuelling. Spill response kits to be available in case of fuel leaks. Hazardous materials will be suitably stored to prevent leaks and spills. Adequate bunding will be provided for all fuel and chemical storage. Prohibition of pesticides, defoliants and fertilizers remains discharge to the land, irrigation and drainage system.
Earthworks / field levelling	Mobilisation of dust and secondary impacts on workers' health	Undertake earthworks during suitable weather conditions i.e. low wind strength to minimise the level of windblown dust, which may be potentially contaminated. Workers to wear suitable PPE to protect against inhalation of dust. A risk assessment will be carried out to identify the level of PPE required in line with site specific risk factors.
Plant care	Impacts of pesticides, defoliants and fertilizers on soil quality	Prohibition of excessive application of pesticides, defoliants and fertilizers. Introduction of strict instructions on preparation of solutions of fertilizers, pesticides and other agrochemicals, and accurate identification of crops needs.

Source: Mott MacDonald

As with the construction phase there is a potential for impacts to the health of site workers when handling hazardous materials. These will be addressed through the implementation of the Occupational Health and Safety Management System.

Decommissioning Mitigation Requirements

Most of the mitigation requirements required for the construction phase also apply to the decommissioning phase. This particularly concerns management of contamination and handling of hazardous materials.

A decommissioning and restoration plan should be developed to apply throughout the lifetime of the Project and should identify demolition, disposal, pipeline decommissioning, aftercare and monitoring approach. Progressive rehabilitation should be undertaken throughout the Project as facilities are decommissioned and / or cease to operate.

Appropriate remediation of contaminated areas should be undertaken in line with national requirements and international good practice.

6.2.6 Residual Impacts

Significance of identified and assessed impacts can be changed through the implementation of mitigation and enhancement measures. The residual effects of the Project contamination impacts are identified in Table 6.16.

Table 6.16: Summary of impacts

Activity	Potential Impacts	Sensitivity	Magnitude	Significance	Mitigation	Residual Impacts
	Construction and Decommissioning					
	Earthworks / Intrusive construction and deconstruction works / field levelling	Mobilisation of dust with potential secondary impacts to workers health.	High	Minor	Implementation of a comprehensive Construction Management Plan for each site. Good site practice and appropriate use of PPE in line with the national requirements and the IFC EHS General Guidelines.	
		Uncover contaminated soils that may present a risk to workers health or the environment if left in place. Impacts to workers health or the environment if contaminated soils are not suitably stored, handled or disposed.	Low to high	Minor to moderate	Guidance on the correct procedures should contaminated land be encountered will be detailed in the Construction Management Plan. This will include guidance on the correct storage, handling and disposal of contaminated soils. In all cases quantitative risk assessment to be undertaken to determine if remediation is required.	
	Leaks and spills of hazardous materials	Soil quality	Negligible to low	Minor	A Construction Management Plan will be developed for each site. Best practice construction techniques. Compliance with local and international guidance.	
		Groundwater quality	Medium	Minor		
		Potential secondary impacts to surface water and human health	Medium to high	Minor		
	Wastewater from construction, integrity testing and cleaning	Soil quality Secondary impacts on groundwater quality and human health	Low to high	Minor	A Construction Management Plan will be developed for each site. Best practice construction techniques. Wastewater requiring treatment to be processed in the clarification ponds before discharge to irrigation channels.	
	Operation					
	Earthworks / field levelling	Mobilisation of dust with potential secondary impacts to workers health.	High	Minor	Implementation of a comprehensive Safety sheets. Good site practice and appropriate use of PPE in line with the national requirements and the IFC EHS General Guidelines	
	Leaks and spills of hazardous materials	Soil quality	Negligible to low	Moderate	Compliance with local and international guidance. Emergency Response Plan and Spill Contingency Plan in accordance with local regulations and IFC and HSE guidance	
		Groundwater quality	Medium	Minor to moderate		
		Potential secondary impacts to surface water and human health	Medium to high	Minor to moderate		

Activity	Potential Impacts	Sensitivity	Magnitude	Significance	Mitigation	Residual Impacts
	Site drainage	Soil and groundwater quality	Negligible to medium	Minor	Introduction of strict instructions on preparation of solutions of fertilizers, pesticides and other agrochemicals, and accurate identification of crops needs.	

6.2.7 Proposed Monitoring and Reporting

Detailed records shall be kept for tracking all fertilizers, pesticides, defoliants, oils, fuel, and other hazardous materials used by the Project. Plant care aids application shall be controlled, and excessive use prevented.

A Soil and Drainage Water Monitoring Plan shall be developed to control soil and drainage water quality and prevent pollution.

6.3 Water Resources and Water Quality

6.3.1 Introduction

This Chapter addresses the potential impacts of construction and operation of the Project on hydrology, water resources, surface and ground water quality and flood risk. The objective of this assessment is to predict potential impacts of the proposed development on the water environment, and to propose measures to mitigate the effects as appropriate.

It is not proposed that groundwater will be used as a source of water for the Project so assessment of quality and quantity in respect of usage has not been included in this ESIA. Additionally, information provided by the FE “Indorama Agro” LLC, results of the irrigation and underground (drainage) water tests conducted by the Consultant, and other information in public access indicate that ground water is naturally saline. As such it is not possible to definitely assess the possible contribution of the fertilization process to ground water quality and this aspect is not discussed future in the ESIA Report. For more information see 6.3.6.

Where appropriate, proposals for future monitoring of the water environment have been put forward as a means of evaluating the accuracy of the impact prediction and the success of the implemented mitigation measures.

6.3.2 Legislation and Guidance

6.3.2.1 National Legislation

Since the recipient water bodies (Kashka Darya river, Deuhana lake, Aidar-Arnasay closed lake system) are integrated into the Uzbekistan’s irrigation-and-drainage system and actually function as accumulators of drainage water and mineral salts washed out of soil as a result of fields’ irrigation, the regulations of the Republic of Uzbekistan for fishery and drinking water bodies are not applicable to them. No other national standards are existent which would regulate water quality in water bodies where flow and surface area is backed up by drainage water.

Storm water discharge to land (drainage collectors) will be subject to consent from local environmental supervision authorities. No quantity or quality information on wastewater is available at present, as the Project facilities design has not been developed by now. Design estimations of quality of storm water runoff from the Project sites shall be prepared in compliance with SanPiN RUz No.0318 – Hygienic and counter-epidemic requirements to protection of water in water bodies in the Republic of Uzbekistan. It should be noted that, even though drainage collectors are not water bodies, they discharge to water bodies. Therefore, wastewater shall comply with the requirements listed in Table 6.17.

Table 6.17: Surface water contamination hygienic assessment criteria

Parameter	Water pollution degree			
	Acceptable	Moderate	High	Extremely high
Failure of organoleptic standards (MPC)	<1.0	1.1-4.0	4.1-8.0	>8.0
Failure of sanitary-toxicological standards (MPC)	<1.0	1.1-3.0	3.1-10.0	>10.0
Mineral content: mg/dm^3 (dry residue)	<1000	1001-1500	1501-3000	>3000
Odour, taste (points)	<2.0	2.1-3.0	3.1-4.0	>4.0
BODtot, mgO_2/dm^3 (category 1 water bodies)	<3.0	3.1-5.0	5.1-7.0	>7.0
BODtot, mgO_2/dm^3 (category 2 water bodies)	<6.0	6.1-8.0	8.1-10.0	>10.0
COD, mgO_2/dm^3 (category 1 water bodies)	<15.0	15.1-30.0	30.1-40.0	>40.0

Parameter	Water pollution degree			
	Acceptable	Moderate	High	Extremely high
COD, mgO_2/dm^3 (category 2 water bodies)	<15.0	15.1-30.0	30.1-40.0	>40.0
Dissolved oxygen, mgO_2/dm^3	>4.0	3.9-3.0	2.9-1.0	<1.0
Permanganate oxidability, mgO_2/dm^3	<2.0	2.1-5.0	5.1-10.0	>10.0
Coli index (<TOC in 1 dm^3 of water)	$<1\cdot10^{4*}$	$1\cdot10^4$ -$1\cdot10^5$	$1\cdot10^5$ -$1\cdot10^6$	$>1\cdot10^6$

Source: SanPiN RUz No.0318

Sanitary wastewater will be collected in septic tanks and removed for treatment by contractors. Such wastewater will be required to meet the contractor's technical conditions and requirements to material in septic tanks. No standards for material in septic tanks are set at the national level.

6.3.2.2 Applicable International Guidelines

International Finance Corporation

The International Finance Corporation, a member of the World Bank Group, has produced General EHS Guidelines that apply to investment projects in various industry sectors. The relevant limit values for sanitary wastewater are detailed in Table 6.18. Storm water runoff from hardstandings should be treated in oil water separators and grease traps installed and maintained as appropriate at refuelling facilities, workshops, parking areas, fuel storage and containment areas.

Table 6.18: Indicative values for treated sanitary sewage discharges

Pollutants Units	Guideline Value
pH	6 – 9
BOD mg/l	30
COD mg/l	125
Total nitrogen mg/l	10
Total phosphorus mg/l	2
Oil and grease mg/l	10
Total suspended solids mg/l	50
Total coliform bacteria MPNb / 100 ml	400

Source: IFC

6.3.3 Methodology and Assessment Criteria

As described in Chapter 3, the significance of any effect (adverse or beneficial) is determined in relation to the sensitivity of the receptor and the magnitude of the impact. For the hydrology and water quality assessment the sensitivity and magnitude are set out in Table 6.19 and Table 6.20 respectively.

Table 6.19: Sensitivity of receptors

Sensitivity	Definition
High	• Receptor is of high ecological importance or National or International value (e.g. RAMSAR, Sites of Special Scientific Interest, Special Areas of Concern, habitat for protected species); • Water body classified as "Specially Protected"; • Receptor is assessed using guidance from the European Union's Water Framework Directive as 'good' • Receptor is used for public and/or private water supply; • Designated as a Bathing Water;
Medium	• Receptor is assessed using guidance from the European Union's Water Framework Directive as 'improving' • Water body used for private water supply but not public water supply
Low	• Receptor is assessed using guidance from the European Union's Water Framework Directive as 'poor' • Receptor not used for water supplies (public or private);

Sensitivity	Definition
Negligible	• Receptor lies outside the sphere of influence of the proposed Project.

Table 6.20: Magnitude of impact

Magnitude of Impact (positive or negative)	Definition
Major	• Fundamental change to the hydrological conditions assessed resulting in temporary or permanent change.
Moderate	• Detectable change to the hydrological conditions assessed resulting in non-fundamental temporary or permanent change.
Minor	• Detectable but minor change to the hydrological conditions assessed.
Negligible	• No perceptible change to the hydrological conditions assessed.

Wastewater impacts address the effects of effluent discharges on receptors and predominantly concern water quality issues. Where national or applicable international water quality standards exist, these are used as indicators of magnitude of the impacts and, in the case of potable standards, the sensitivity of the receptors. In this chapter reference is made to Maximum Permissible Concentrations (**MPCs**) for water bodies of fishery importance and for water bodies of recreational importance.

The assessment assumes that good international industry practice[61] (**GIIP**), as set out in EHS Guidelines, will be adopted as the minimum level of mitigation in the absence of national legislation or applicable international guidance. GIIP is regarded as embedded mitigation and as such these measures are not explicitly identified as mitigation measures, although are set out in this section in order to confirm the measures that are considered relevant for this aspect.

Following the consideration of appropriate mitigation measures, a final assessment of the residual impacts is made such that the ESIA can conclude with a statement of significance.

6.3.4 Surface Water Resources

Talimarjan Reservoir filled by Amu Darya river will be the main water source for irrigation of the Project fields in Kashkadarya Region, whereas Sardoba reservoir fed by Syr Darya river will be the main water supply source for Syrdarya Region.

Irrigation systems in Uzbekistan are comprised of wide-reaching facilities funded by a dedicated state fund and managed by Irrigation System Basin Authorities (**ISBA**) accountable to the Ministry of Water Resources of the Republic of Uzbekistan. The ISBA tasks include maintenance and development of irrigation systems, as well as making sure that sufficient water is supplied to farms and the Water User Associations (**WUA**).

The irrigation system includes the main water draw-off facilities, main, distribution and watering canals, watering machinery and equipment, and lock-weir and drainage networks. Watering systems consist of inter-district and inter-farm canals that supply water to fields of several WUAs, and internal canals of specific WUAs serving several farms. Functioning and serviceability, soundness and proper use of main and inter-farm canals, pipelines and associated facilities is the responsibility of Regional Irrigation System Administrations. Water User Associations bear the cost of maintaining and operating of their internal irrigation systems.

Talimarjan Reservoir

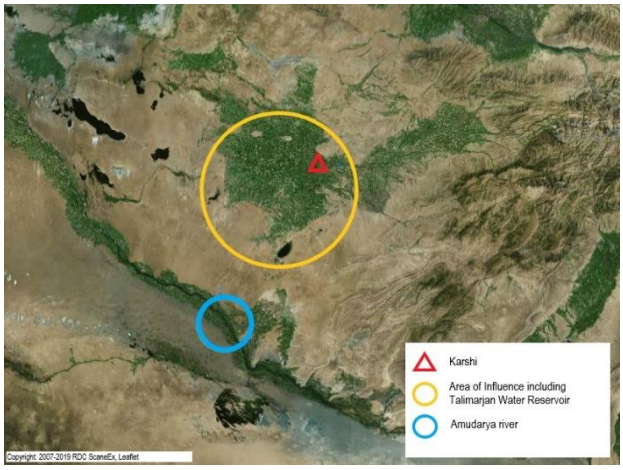
Talimarjan reservoir is located in the south-west of Kashkadarya Region. The reservoir with effective storage capacity of 1.5 billion m^3 is intended for regulation of water supply to fields through the main canal of Karshi. Water coming from Amu Darya river by the Karshi main accumulates in the reservoir during the autumn-winter period and is then used in summer.

[61] GIIP is defined as the exercise of professional skill, diligence, prudence, and foresight that would reasonably be expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally or regionally

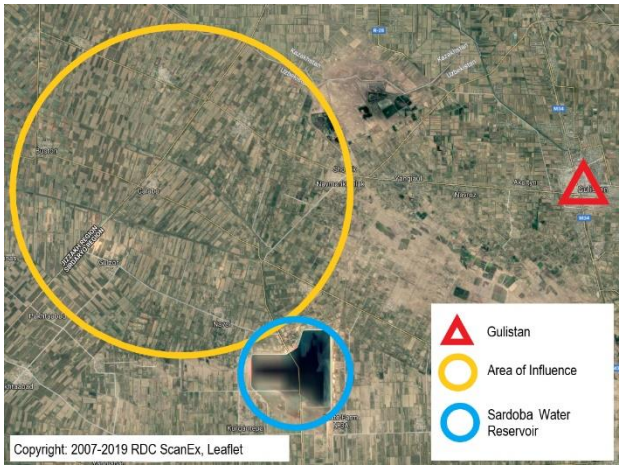
Sardoba Reservoir

The reservoir is located in Syrdarya Region to the south of the Project fields. Its construction was started in 2010 and has not been finished by present Once completed, the reservoir will have effective storage capacity of 922 million m³. Furthermore, a hydropower plant will be built at the reservoir.

Map 6.1: Talimarjan water reservoir



Map 6.2: Sardoba water reservoir



Source: Kosmosnimki.ru

It should be noted that during low season river water is routed to the irrigation system through bypass canals avoiding the reservoirs, and any unused water that did not get into the trough system is diverted into the drainage system and further into the recipient water bodies.

The required water level in reservoirs to satisfy the needs of users and maintain serviceability of the irrigation system is calculated and managed by Irrigation System Basin Authorities. Water supply to irrigation systems is financed by the State (subsidised).

6.3.5 Sufficiency of water supply

According to the information provided by the Ministry of Water Resources of the Republic of Uzbekistan[62], irrigation water supply in the Kashkadarya region in 2019 amounts about of 3 347 million m³ or 6500 m³ per hectare, in the Syrdarya region 2,448 million m³ or 8600 m³ per hectare (see Table 6.21).

Table 6.21: General data on irrigation water supply, 2019

Regio	Irrigation area, ha*	Water supply, 2019, m³**	Maximum water demand (by cotton), m³/ha*	Water demand (July-August), m³/ha*	Actual water supply per ha, m³/year
Kashkadarya	514600	3347000000	6600 (March)	4100 – 3300	6500
Syrdarya	287100	2484000000	4300 (April)	5000 - 2700	8600

Source: MinVodKhoz (see Vol. III)

* Total irrigation area

** Communal and industrial water supply is not included

The amount of water required for irrigation of cotton is indicated in Figure 1.1 provided in accordance with the norms established for various humidity regions (hydro-module zones) of the Republic of Uzbekistan:

- For the initial period of cotton growing (March-April) which is a peak period of water consumption for irrigation needs, and
- For the hottest period of cotton vegetation (July and August).

62 http://www.water.gov.uz/ru

Therefore, the water supply in the Syrdarya region is twice the amount of water required for irrigation of cotton crops during the peak season. At the same time, the data on water supply in the Kashkadarya region for March indicate an insufficiency of water supply, but do not take into account the fact that not all agricultural land in the region is in crop rotation (salinated, abandoned, fallow, etc.). In addition, soil washing and cotton irrigation are usually carried out in the different fields at different times.

Figures below illustrate the water balance of the irrigation systems of the two regions over the past three years, which indicates the proportionality of such indicators as water supply, expenditure on irrigation and other needs.

Figure 6.1: Kashkadarya water balance

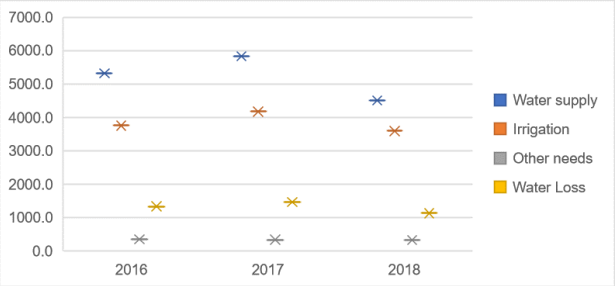
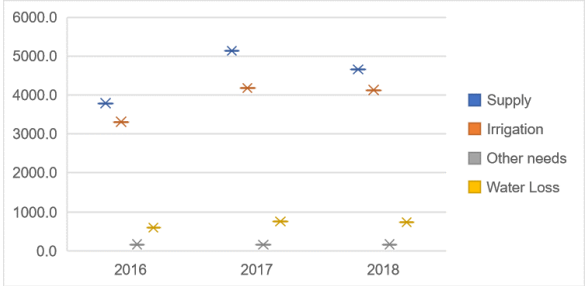


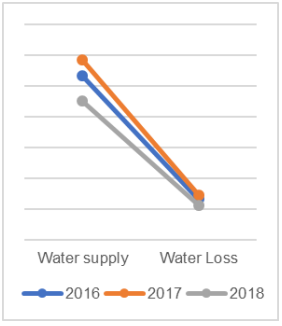
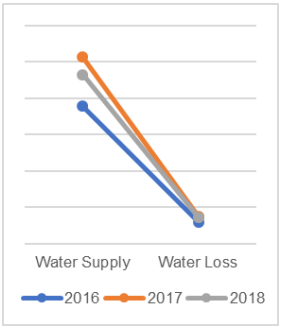
Figure 6.2: Syrdarya water balance



Source: MinVodKhoz

Despite the different volumes of water supply from year to year, the absolute losses of water in both regions are unchanged from year to year.

Table 6.22: Irrigation water lose

	Kashkadarya region				Syrdarya region			
	2016	2017	2018	Sparkline	2016	2017	2018	Sparkline
Water loss, mln. m^3	1330	1458	1127		597	758	734	

Source: Mott MacDonald

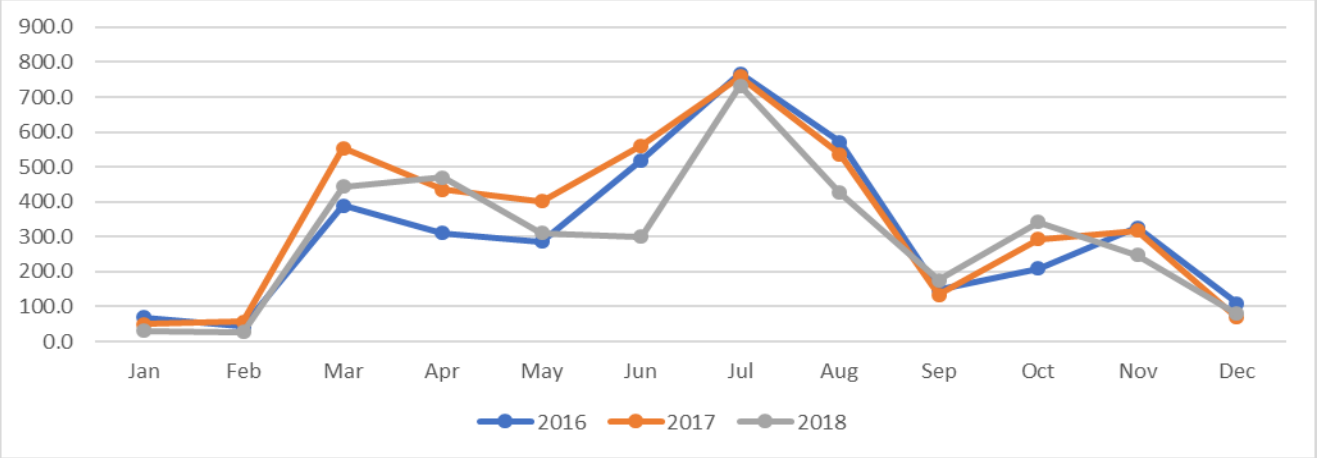
According to the information received from the local authorities, about 50% of the irrigation trays and channels are in emergency condition or destroyed (Vol. III). This may confirm the assumption that the water losses are due to the poor condition of the distribution network and lack of irrigation channels and trays repairs. This conclusion is also confirmed by the results of focus groups with farmers and local residents conducted by the Consultant in December 2019. It was noted that before the start of the Indorama company operations in the Kashkadarya and Syrdarya regions, there was not enough water for irrigation, and after the repair and cleaning of irrigation channels and trays by the Indorama company, water began to flow in sufficient volume.

To analyse the sufficiency of the water resources of the Amu Darya and Syr Darya rivers, based on an analysis of glacial water reserves and water supplied with precipitation, the analysis of climatic risks is given (see Section 6.9).

During the ESIA study, the Consultant requested information on the water supply of the Project sites from the Ministry of Water Resources of the Republic of Uzbekistan and local authorities, however, we were not able to obtain all the necessary information that could accurately indicate the adequacy of water supply for both the

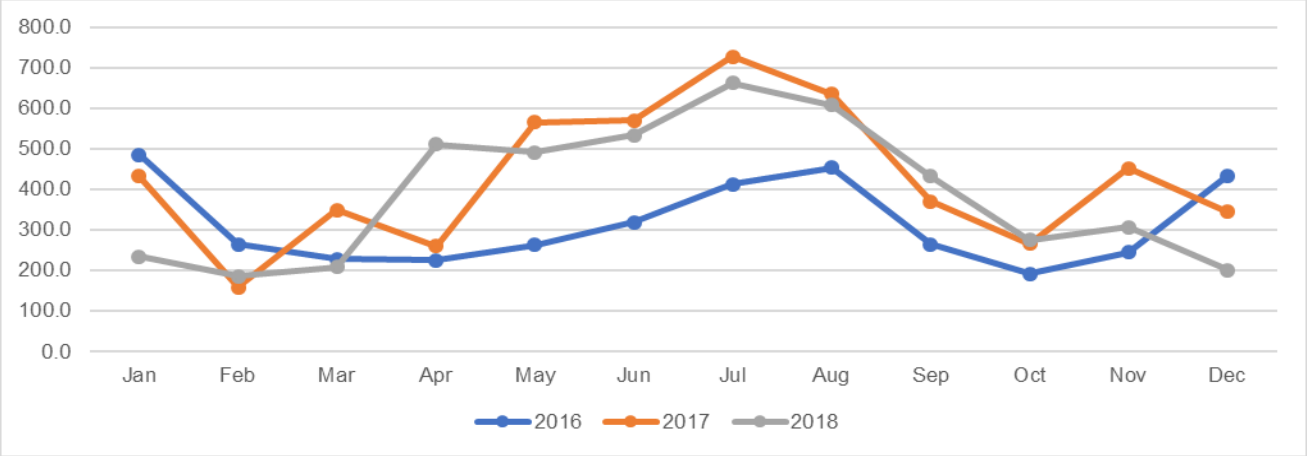
project sites and the areas cultivated by the local population affected by the Project. However, the available information allows the analysis of water supply by month.

Figure 6.3: Irrigation water supply in Kashkadarya region, mln. m^3



Source: Mott MacDonald

Figure 6.4: Irrigation water supply in Syrdarya region, mln. m^3



Source: Mott MacDonald

As shown in the pictures above, the water supply in two regions is cyclical and depends on the needs of agriculture. In the autumn-spring wetter period, the water supply is less, which is necessary for watering crops such as wheat, mung bean, vegetables and others. In the spring-summer period, the water supply increases and reaches its peak in June-August for irrigation of cotton.

Summarizing the discussed above, it is possible to say that the average annual water supply for irrigation of the Kashkadarya and Syrdarya regions is provided in a sufficient or excessive volume for cultivation of cotton and other crops. The water deficit in some areas of the Syrdarya and Kashkadarya regions is primarily associated with poor technical condition of the irrigation system and significant water losses.

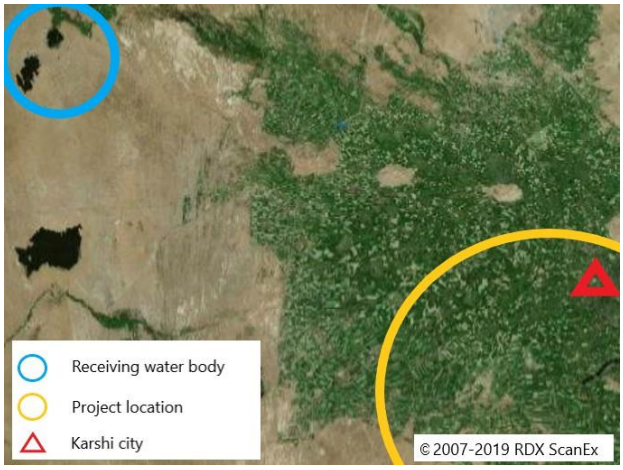
Based on the methodology of crop watering applied by Indorama it is expected and confirmed by the first results of cotton farming in 2019, that cotton grow by Indorama methodology will require 30% less water for irrigation and future decrease of water consumption from Syrdarya and Amu Darya rivers, and with support of wide scale irrigation system repair programme it will increase water accessibility for local communities.

6.3.6 Recipient Water Bodies

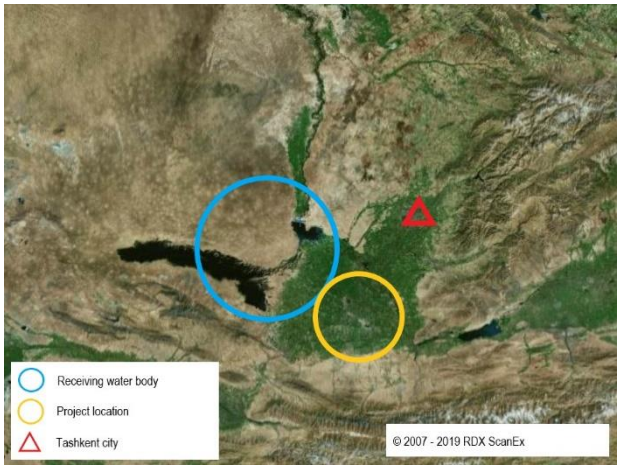
Drainage channels being part of irrigation system in both regions are designed to improve water-air, thermal and salinity conditions in soil. Irrigation water that passes through soil mass is stopped by a watertight horizon and proceeds to the edge of the field where it seeps into the drainage canal. These canals transport surplus water with dissolved salts to the recipient, which leads to degradation of water quality in recipient water bodies.

Deuhana desert lake (depression) in Bukhara region is the recipient water body for the Kashkadarya Region drainage system. The recipient of drainage water from Syrdarya Region – Aydar-Arnasay lake system is a Ramsar key ornithological area (see Map 6.3 and Map 6.4).

Map 6.3: Deuhana lake



Map 6.4: Aidar-Arsay lake system



Source: Kosmosnimki.ru

Deuhana is a lake in the south of Bukhara Region of Uzbekistan lying in a natural depression. The lake is filled by the flow of Kashkadarya river (50-60 million m^3 a year) that consists almost completely of collector drainage water from irrigated lands of Kashkadarya Region. The lake features water level of 250 m, volume 250 million m^3, total area of water surface 23 km^2, annual water evaporation 35 million m^3.

The Aydar-Arnasay closed lake system is comprised of Aydarkul lake, Tuzkan lake and smaller East-Arnasay lakes. The lake system is situated in saline soil lowland in the extreme east area of Kyzyl Kum desert, to the south-west of Shardara Reservoir. The lakes total area is about 4000 km^2. Till the middle of 20^{th} century, Arnasay lowland had been a dry salt lake that turned into Tuzkan lake only for a short period in spring and then dried out again. The Arnasay lake system emerged in 1969 during a catastrophic flood in the Syr Darya river basin. The Arnasay lowland served as a buffer capacity for accumulation of 21.8 km^3 of surplus water. The catastrophic flood raised water level in Tuzkan lake by 10 m and in the Aydar salt lake by 22 m. At present the lakes are fed by the irrigation drainage water, and a part of flood water from Shardara Reservoir. The Arnasay lake system demonstrates seasonal patterns with water level rise in winter-spring period, decline in summer, and steady conditions in autumn-winter.

6.3.7 Water Quality

The assessment takes into account the following factors that influence quality of the irrigation water:

- River water from Amu Darya and Syr Darya is supplied to the irrigation system from various sources, from reservoirs, and also directly from the rivers via the canal mains;
- Water quality in all sections of Amu Darya and Syr Darya rivers is variable and depends on the nature and duration of water use impacts in different countries.

In view of the above and considering the differences between irrigation water sources and recipient water bodies, it is deemed appropriate to assess the Project impact against water quality in the distribution canals, i.e. the water immediately used for irrigation.

Samples for water quality testing were taken from the distribution and drainage canals in the Project area, in Kashkadarya and Syrdarya Regions.

Drainage canals for sampling were selected with due regard to status of the nearest field (source of drainage water) that influences drainage water quality. Therefore, drainage water samples were taken from canals fed by fields that, at the time of sampling, fell into the following categories: sown with cotton, sown with other crops, fallow, abandoned, saline.

Results of the irrigation and drainage water analysis are shown in Table 6.23.

Table 6.23: Results of water tests

Sample number	Water point location	Physical properties	Hardness Total: 7* Carbonate Noncarbonate	pH+: 6.5-8.5* 6-9**	Mineralisation: 1000*	H_2S, mg/l:	Unit	Anions, mg/l						Cations, mg/l							
								CO_3	HCO_3	Cl: 300/350*	SO_4: 100/500* 400**	NO_3: 9.1/25* 50**	NO_2: 0.02/0.5* 0.01-0.03**	Ca	Mg	Na	K	Fe_2: 0.05/0.5* 1**	Fe_3	NH_4: 0.5/2* 0.04-1**	PO_4: 0.3/1* 2**
Kashkadarya region																					
4	Kamashi Channel	Colorless, transparent, no precipitate, weakly salted, odorless	11.30	7.80	1200	0.00	mg/l	0.00	159	168	548	6	0.05	64	98	170	5	0.2	0.3	0.4	0.023
			2.60		1139		mg-eqv/l		2.60	4.75	11.42	0.10	-	3.20	8.10	7.40	0.12	0.01	0.02	0.02	
			8.70				%-eqv/l		14	25	60	1	-	17	43	39	1	-	-	-	
7	Mirashkan Channel	Colorless, transparent, no precipitate, weakly salted, odorless	5.70	7.80	530	0.00	mg/l	0.00	104	71	227	4	0.05	42	44	61	4	0.3	< 0,3	0.4	0.019
			1.70		506		mg-eqv/l		1.70	2.00	4.73	0.06	-	2.10	3.60	2.66	0.10	0.01	-	0.02	-
			4.00				%-eqv/l		20	23	56	1	-	25	42	32	1	-	-	-	-
5	Channel R - 4 (KMK)	Colorless, transparent, no precipitate, weakly salted, odorless	6.50	8.00	630	0.00	mg/l	0.00	110	115	239	2	0.05	50	49	79	4	< 0,3	< 0,3	0.7	0.019
			1.80		610		mg-eqv/l		1.80	3.25	4.99	0.03	-	2.50	4.00	3.48	0.10	-	-	0.04	
			4.70				%-eqv/l		18	32	50	-	-	25	40	34	1	-	-	-	
1	Collector YU-6	Colorless, transparent, no precipitate, weakly salted, odorless	36.00	7.90	3880	0.00	mg/l	0.00	342	408	2037	15	0.05	321	243	542	7	< 0,3	<0,3	<0,1	0.019
			5.60		3764		mg-eqv/l		5.60	11.5	42.44	0.24	-	16.00	20.00	23.59	0.17	-	0.02	-	-
			30.40				%-eqv/l		9	19	71	1	-	27	33	40	-	-	-	-	-
2	Collector K-3	Colorless, transparent, no precipitate, weakly salted, odorless	33.50	7.30	3800	0.00	mg/l	0.00	366	532	1802	6	0.05	361	188	564	21	< 0,3	0.3	0.7	0.031
			6.00		3678		mg-eqv/l		6.00	15.00	37.55	0.10	-	18.00	15.50	24.54	0.55	-	0.02	0.04	-
			27.50				%-eqv/l		10	26	64	-	-	30	26	43	1	-	-	-	-
3	Collector YUK-6	Colorless, transparent, no precipitate, weakly salted, odorless	36.50	7.80	3700	0.00	mg/l	0.00	336	399	1955	15	0.3	246	294	483	7	< 0,3	0.3	< 0,1	0.055
			5.50		3588		mg-eqv/l		5.50	11.25	40.72	0.24	0.01	12.30	24.20	21.02	0.18	-	0.02	-	-
			31.00				%-eqv/l		10	19	71	-	-	21	42	37	-	-	-	-	-
6	Collector 2-K-2	Colorless, transparent, no precipitate, weakly salted, odorless	34.00	7.70	3360	0.00	mg/l	0.00	165	390	1794	24	0.1	431	152	399	4	0.3	< 0,00	< 0,1	0.012
			2.70		3289		mg-eqv/l		2.70	11.00	37.38	0.39	-	21.50	12.50	17.36	0.10	0.01	-	-	-
			31.30				%-eqv/l		5	21	73	1	-	42	24	34	-	-	-	-	-
Syrdarya region																					
1	Okoltin Channel 17 KCHA	Colorless, transparent, no precipitate, weakly salted, odorless	11.5	7.9	1032	0.00	mg/l	0.00	153	27	580	6	0.1	90	85	87	6	< 0,3	< 0,3	0.4	0.094
			2.5		974		mg-eqv/l		2.5	0.75	12.09	0.1	-	4.5	7	3.77	0.15	-	-	0.02	-
			9				%-eqv/l		16	5	-	-	-	29	45	25	1	-	-	-	-
5	KRT Channel 2 Sardoba	Colorless, transparent, no precipitate, weakly salted, odorless	11	8	1010	0.00	mg/l	0.00	134	80	516	6	0.1	78	86	94	6	10.3	0.3	1	0.019
			2.2		954		mg-eqv/l		2.2	2.25	10.75	0.1	-	3.9	7.1	4.07	0.15	-	0.02	0.06	-
			8.8				%-eqv/l		14	15	70	1	-	26	46	27	1	-	-	-	-
2	Tashloma Collector Stake.	Colorless, transparent, no precipitate, weakly salted, odorless	15.8	7.6	1580	0.00	mg/l	0.00	165	160	806	2	0.05	172	88	186	6	< 0,3	< 0,3	0.2	0.027
			2.7		1519		mg-eqv/l		2.7	4.5	16.8	0.03	-	8.6	7.2	8.07	0.15	-	-	0.01	-
			13.1				%-eqv/l		11	19	70	-	-	36	30	34	1	-	-	-	-
3	Collector #3	Colorless, transparent, no precipitate, weakly salted, odorless	16.4	7.8	1520	0.00	mg/l	0.00	177	133	815	4	0.1	140	114	164	5	< 0,3	< 0,3	< 0,1	0.027
			2.9		1480		mg-eqv/l		2.9	3.75	16.97	0.06	-	7	9.4	7.13	0.13	-	0.02	-	-
			13.5				%-eqv/l		12	16	72	-	-	29	40	30	1	-	-	-	-
4	Collector spacecraft 7 8/1	Colorless, transparent, no precipitate, weakly salted, odorless	22.3	6.9	2220	0.00	mg/l	0.00	214	248	1136	4	0.05	198	151	270	5	< 0,3	< 0,3	0.2	0.016
			3.5		2146		mg-eqv/l		3.5	7	23.66	0.06	-	9.9	12.4	11.76	0.13	-	0.02	0.01	-
			18.8				%-eqv/l		10	21	69	-	-	29	36	35	-	-	-	-	-
6	6 Collector KA 7/6/6/6	Colorless, transparent, no precipitate, weakly salted, odorless	12.5	7.15	1080	0.00	mg/l	0.00	134	80	584	2	0.05	96	94	89	7	< 0,3	0.3	1	0.027
			2.2		1040		mg-eqv/l		2.2	2.25	12.16	0.03	-	4.8	7.7	3.88	0.18	-	0.02	0.06	-
			10.3				%-eqv/l		13	14	73	-	-	29	46	23	1	-	-	1	-

Exceed national limits

Exceed international requirements

Exceed both limits

* National requirements: O'zDSt "Centralised tap w ater sources" / Refference Book of Environmental Expert. State Committee of the Republic of Uzbekistan on Environmental Protection, 2009

** EU Council Directive 78/659/EEC / IFC General Guadelines

The analysis results showed that irrigation water for multiple parameters fails the national quality standards for fishery and recreational-domestic water bodies, as well as EU and IFC requirements. Water quality further deteriorates as water seeps from the field surface to the drainage system.

Being transboundary rivers, Amu Darya and Syr Darya are exposed to pollution impact of animal farming, domestic, industrial wastewater and drainage water along their whole lengths. Also, it should be noted that the source conditions predetermine the high mineral content and elevated concentrations of metal salts in waters of Amu Darya and Syr Darya rivers.

Comprehensive studies of water quality in Amu Darya and Syr Darya rivers were conducted in 2011 by the Central Asian Regional Environmental Center (CAREC) with UNECE support, and their findings are presented in the Analytical Report[63].

The studies concluded that intensive development of irrigated farming and land drainage in Central Asia along with growing water use for industrial and household needs resulted in increased abstraction of fresh water and discharges of polluted return flow into water bodies. The main pollution sources are agrochemicals that are washed out into drainage systems and mixed with river water. The second-ranking source in terms of impact on the quality of water resources is the effluent from municipal and industrial sewers. An increased contamination of groundwater due to substandard management of municipal and industrial waste sites, especially in the mining industry is also noted.

River quality statistics for the past 40 years confirm the trends of an increased salinity, both over time and along the length of the rivers affected. Water suitability for irrigation purposes depends not only on the salinity but also on the chemical content. In particular, a consistent trend has developed for changes in the ionic composition of salts in the water toward a dangerous increase in alkalinity, nitrites, iron salts, pesticides, petroleum products and other compounds.

Deterioration of water quality and increased minerals content in water after infiltration from the fields into the drainage canals is primarily due to wash-out of agrochemicals (fertilizers) and salts from soil.

Water testing for pesticides used by local farmers and expected during the Project implementation (Gyphosate, Propaquizafop, Imidacloprid, Cypermethrin, Chlorpyrifos, Propargite, Emamectin Benzoate, Chlorantraniliprole) did not detect presence of these chemicals in drainage water. Four drainage water samples were taken for testing from the channels fed by water from cotton fields. Two samples were taken from drainage canals in Kashkadarya region, and other two - in Syrdarya region. All samples were taken in the height of vegetation season - in the middle of August 2019.

The absence of pesticides in drainage water can be explained by the following factors:

- Pesticides are applied on fields in small quantities, so that chemicals held in colloids in top soil
- Rapid degradation of the tested substances in soil, due to high temperature conditions in summer, exposure to sunlight, and presence of soil microbes that consume pesticides for their biosynthesis processes.

6.3.8 Flood Risk

Amu Darya and Syr Darya river floodplains are located more than 50 km away from the Project sites and are therefore not regarded as potential sources of flooding. The risk of surface runoff is negligible because annual precipitation is approximately 200-300 mm. In view of the above, potential flood risk is not considered for the Project.

[63] http://www.cawater-info.net/water_quality_in_ca/files/analytic_report_ru.pdf

6.3.9 Assessment of Impacts

6.3.9.1 Construction Phase

There are four primary activities that can potentially impact the surface water environment:

- Use of vehicles and machinery
- Works next to or near drainage channels
- Earthworks
- Temporary water supplies (for construction activities).

During the construction phase, the main impact with respect to surface water resources will be the potential for surface runoff with high sediment loads to enter the drainage system. The runoff from the site, particularly excavation works near and within drainage collectors, is likely to have a high sediment load. There is also the possibility of surface runoff being contaminated as a result of accidental fuel and chemical spills during construction.

Given the length and configuration of drainage collectors, it is expected that all suspended matter (e.g. sand, clay) that gets into them will settle on canal bottom and never reach the receiving water bodies. Also, the risk of receiving water contamination with materials from oil and fuel spills can be assessed as insignificant, as the 100-km long drainage system represents a large bio-accumulating capacity – i.e. its aquatic vegetation is well developed and includes *Phragmites australis*, *Typha angustifolia*, *Najas marina*, *Potamogeton pectinatus*, *Potamogeton perfoliatus*, as well as other species that can absorb and accumulate organic contaminants.

6.3.9.2 Operational Phase

Abstraction and Effects on Surface Water Flow Patterns (Surface Water)

Water for the existing agricultural areas is currently abstracted from the Talimarjan water reservoir fed by the Amu Darya river, and from the Sardoba reservoir fed by the Syr Darya river. Talimarjan water reservoir is located more than 5 km to the south from the Project fields in Kashkadarya region, Sardoba water reservoir is located 2 km to the south from the Project fields in Syrdarya region.

Irrigation system in the Project area is mostly gravity based, i.e. water flows are due to the elevation drop. However, in few sections small pumps are used to take water from irrigation canals into the distribution network. Quantity of water supply to irrigation systems is determined and regulated by local Irrigation System Basin Authorities. Water is supplied to irrigation system in abundance, with allowance for the poor technical state of water mains and troughs, large leaks, evaporation, as well as widespread uncontrolled consumption of water by local communities (watering of gardens and other domestic needs). This fact was also illustrated by overflows and underflooding observed in the irrigation system. However, certain parts of the Project area are exposed to water deficit, due to poor condition of the distribution network, tie-ins, leaks, etc.

Irrigation water consumption by farms and households is not metered. The cost of irrigation water supply for crop farming is fully covered by government subsidies, and all users in rural areas get the service free of charge.

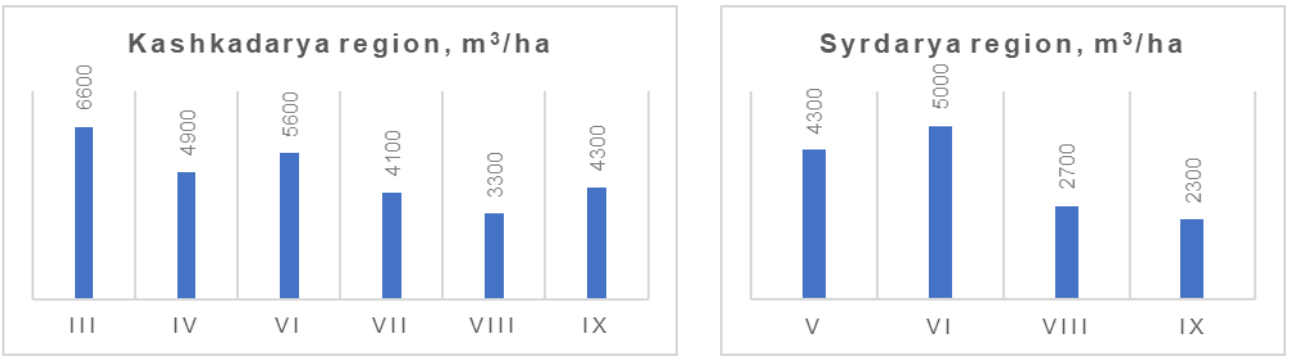
The Project will use water for the following purposes:

- Crops watering
- Domestic and operational needs
  - Water for preparation of agrochemical solutions
  - Vehicles washing
  - Fire-suppression systems
  - Household needs.

Crops Watering

Depending on ground water level, climate, soil and other conditions, the number of irrigations of cotton varies within a wide range from 2 to 12, at the irrigation rates from 2 to 8 thousand m^3/ha and raw-cotton crop yield of 3-4 t. Different combinations of irrigation numbers, distribution and rates are applicable for cotton farming in various climatic zones and soil-amelioration conditions in irrigated areas of Uzbekistan.

Figure 6.5: Irrigation norms in different HMZs of Kashkadarya and Syrdarya regions



Source: FE “Indorama Agro” LLC

As the Project land plots are located in different hydro-module zones, they feature different irrigation requirements (as illustrated in the figure above). Therefore, it is advisable to refer the Project resource efficiency assessment to water consumption per 1 ton of raw cotton.

According to Indorama, current irrigation water consumption in the Project areas is about 3,000 m^3 per 1 ton of raw cotton. It is expected that improvements brought about by the Project will help to reduce water demand for cotton production by 30%, and further reduction of 20% will be achieved through cutting down water losses caused by poor state of the irrigation systems.

The Project provides for the following improvements that will result in overall reduction of water consumption from 3,000 m^3 to 2,000 m^3:

- Laser levelling of fields (expected reduction of water consumption by 20%)
- Improvement of irrigation channels will decrease water transmission losses
- Improvement of drainage systems will reduce soil salinity thus reducing the need of water use for soil leeching
- Pivots and laterals with targeted water applications will reduce water usage
- Improved irrigation scheduling will help to avoid excessive and deficient irrigation of crops
- Improved soil organic matter will increase soil water holding capacity
- Reduced salinity of soil will result in lower / eliminated water applications for leaching.

In addition, FE “Indorama Agro” LLC is in process of land redevelopment in both regions and intending to use various techniques for irrigation systems which includes syphon system, pivot/lateral irrigation system etc. Exact acreage and area for irrigation system depends upon land redevelopment plan, which depends upon complete land area survey. Survey will take one more year to assess. The above irrigation techniques will be implemented over period of 5 years based on such survey and design as prepared by the consultant on land redevelopment.

FE “Indorama Agro” LLC will consider other irrigation methods like, fluming, pulsar or drip irrigation based on crop type and land area design. For mulberry Indorama will install drip irrigation which is more sustainable for gardens. Existing water supply volume is sufficient and provided from two large water reservoir but limited in some areas due to the bad condition of the irrigation system. Furthermore, rehabilitation of irrigation system

will decrease water leaks, improve water availability in water deficit parts of the Project area and decrease of total water demand for all water users such as farmers and population which are use irrigation system for irrigation of private gardens and fields.

In addition, drainage water reuse for irrigation is being considered. Drainage water is monitored for quality (mineral content) and availability. FE “Indorama Agro” LLC will use the monitoring data and assessment of drainage water reuse efficiency to make a decision about potential recycling schemes.

Therefore, considering that irrigation water is supplied to the Project area from reservoirs rather than straight from the rivers, and that the Project cropland makes up about 5% of irrigated land in Kashkadarya Region and 28% of irrigated land in Syrdarya Region, the Project impact on Amu Darya River due to reduction of abstraction volume for irrigation can be assessed as insignificant beneficial, and on Syr Darya River - as minor beneficial.

It is necessary to highlight the risks of uncontrolled application of pesticides and fertilizers in the fields, and the risks of excessive soil leaching which may result in pollution of drainage water and recipient water bodies. Increased levels of salts and pesticides will affect biocoenoses in the drainage canals which provide habitat for multiple plant and animal species and serve as forage areas for birds of prey. Given the poor initial quality of water in the Kashka Darya river and Deuhana lake, sensitivity of these receptors to the pollution impact is assessed as medium. The impact on receptors caused by potential increase of salt and agrochemicals levels in drainage water due to reclamation and leaching of abandoned and salinised fields at the initial stage of the Project operation is assessed as major adverse significance, with a trend toward reduction to minor, based on the adoption of best practice measures for the application of fertilizers and pesticides.

The Aidar-Arnasay lake system, being a key ornithological area, has a high sensitivity, therefore, impact on this receptor is assessed as major adverse at the initial stages, with a trend toward reduction to moderate or minor, based on the adoption of best practice measures for the application of fertilizers and pesticides. The Company will develop the Pesticides, Defoliants and Fertilizers Application Annual Plan (envisaged by ESMP) which will regulate methods and volumes of chemicals application, safety requirements etc.

Drinking Water Consumption

It is expected that drinking water for the Project domestic and other needs will be supplied from artesian wells (not included in the Project scope) to be drilled at the gin sites and vehicle depots.

Geological survey has not been conducted by the time of ESIA, and feasibility of ground water supply has not been assessed. There is a risk that artesian water will not be suitable for drinking and other uses, due to potentially high mineral content. In such situation, water for domestic needs will be purchased and delivered to the gin sites and vehicle depots in road tankers.

Since construction of the ground water wells is not covered by the Project, and no information is available to assess the artesian water reserves, water mineralisation, technical parameters and number of wells, impacts of the artesian wells are not considered by the ESIA any further. Project (2 gin plants) will use approximately 70k m^3 of potable water per year or 190 m^3 of water per day for drinking and housekeeping needs, and in production process. Furthermore, given the standard drinking water consumption rate adopted in Uzbekistan, every worker may consume a maximum of 50 litres of water per day. The impact magnitude is considered to be insignificant negative.

Project Wastewater

No process wastewater is expected in relation to the cotton production technology. The Project operation is expected to generate storm water runoff, wastewater from washing agricultural and other machines contaminated with oil and petroleum products, as well as domestic wastewater.

At present, no storm water drainage systems are provided at the gin sites and vehicle depots, and sanitary wastewater is collected in septic tanks or pit latrines. The Project activities (construction and reconstruction of

gin sites and vehicle depots) will include provision of storm water and domestic wastewater collection systems; however, design solutions to treat the waste flows have not been identified at this stage. It is expected that storm water collection and treatment will be provided in compliance with Uzbekistan regulations; such facilities should include grit removal and oil trapping, and so treated water will be discharged to ground (drainage collectors).

In absence of central sewerage systems, sanitary wastewater will be collected in septic tank and subsequently removed for treatment by specialized contractor.

Washing of agricultural machinery and other vehicles will be arranged on dedicated sites with water recycling systems.

Even though information on the future wastewater collection and treatment systems is scarce, considering the local climate (annual precipitation of 200 mm), the standard rates for water consumption and wastewater generation, the Project impact on local habitats, soil and water bodies is assessed as insignificant negative.

6.3.9.3 Decommissioning Phase

Decommissioning phase activities are likely to be very similar to the construction phase. Good practice should be adopted to manage storm water runoff. However, in addition there is a risk of surface water being contaminated as a result of chemicals remaining in various vessels, pipes and other items.

Surface water hydrology can be affected during demolition and decommissioning through the generation of fine materials eroded as a result of clearing surfaces and exposing soils to rainfall and drainage water.

Surface water quality can similarly be affected by such fine materials. This could change the quality of the water, especially if the material is contaminated as a result of previous activities on the site.

Assuming the implementation of good practice measures, the magnitude of the potential impacts of increased sediment loads on water resources, water quality will be negligible or minor. The sensitivity of the receiving water bodies to increased sediment is deemed to be negligible. Therefore, the significance with respect to sediment impacts is assessed as being insignificant and mitigation is not therefore required.

6.3.9.4 Occupational Health and Safety Impacts

Throughout the Project operation, workers will come into contact with irrigation water and drainage water that may carry biological hazards such as helminthic and acute intestinal infections. This is due to the fact that local communities use water distribution and drainage canals for livestock watering and dipping. The Project personnel shall avoid contact with irrigation and drainage water, and shall not bathe in the irrigation canals, drink irrigation or drainage water, wash hands or food in the canals. Medical attention should be sought in case of ingestion of such water.

In all cases the magnitude of occupational health impact is assessed as major and the significance of the impact is assessed to be major.

6.3.10 Mitigation and Enhancement Measures

No mitigation measures are required, provided that the construction follows local construction norms and rules, good environmental practice and pollution prevention measures set out in the ESMP.

These measures include:

- Management of surface drainage and site runoff, particularly during showers, to minimise erosion and the potential for high sediment loads entering the channels
- Storage of excavated material away from drains, and covering stockpiles

- Prevention of pollution by use of hard covered, bunded areas for storage of liquids and refuelling, oil interceptors in areas where fuel is used or stored, provision of spill kits and protocols for their use and appropriate disposal to minimise the impacts of any spillages.

6.3.10.1 Operational phase

No mitigation measures are required, provided that the gin plants and vehicles depots are equipped with storm water collection and mechanical wastewater treatment systems and operate within the guidelines embedded in the design. It is important that the there are no additional uncontrolled releases of any hazardous liquids. Monitoring is required to ensure that the plant remains compliant with approved limits of wastewater discharge.

The rates of fertilizers and pesticides application in the fields shall be adequately calculated to produce the best crop yield with minimum application of the chemicals and shall be at least within the limits recommended by producers. This measure is intended to reduce wash-out of fertilizers and pesticides into the drainage canals, and to minimise the impact on the recipient water bodies.

Drainage water quality shall be continuously monitored for level of petroleum products, pesticides, etc. Emergency action plan shall be developed to respond to accidental discharge of petroleum products, pesticides and other agrochemicals into drainage collectors and irrigation canals.

6.3.10.2 Decommissioning phase

Specific mitigation is required to address the impact of demolishing or removing tanks and pipelines which contain toxic or hazardous materials. Appropriate mitigation will need to be established on a case by case basis depending on the location of the component, its operational use, physical state and the proximity to surface water channels. The measures must be designed to minimise the risk of spills and to ensure that, should a spill occur, the release can be controlled and either treated or removed.

A decommissioning plan should be developed that includes the pollution control measures required for each component.

6.3.11 Residual impacts

There are no residual impacts provided best practice measures are implemented during each phase and that mitigation is put in place during decommissioning.

Following decommissioning there is a risk that hazardous material may remain on site or have leached into the soils. Consequently, there is a residual risk that these materials may contaminate a surface water receptor. The significance of this risk is judged to be minor adverse given that the magnitude of such an event would be minor and the sensitivity of the receptors remains at medium (assuming that no action is taken to resolve existing water quality failures).

6.3.12 Proposed Monitoring and Reporting

Detailed records of fertilizers and pesticides application should be kept, in order to avoid contamination of drainage water with pesticides and petroleum products. Irrigation and drainage water shall be regularly monitored to identify potential impact of the Project on composition of drainage water.

6.4 Ecology and Biodiversity

This Chapter represents the Ecological Impact Assessment of the Project. It describes the relevant framework of the legislation, identifies and assesses potential significant adverse impacts, and then defines appropriate mitigation and enhancement measures that will be implemented by the Project. The baseline studies cover protected areas, habitats and species, and ecosystem services, with information adopted and derived from primary and secondary sources.

6.4.1 Project Area Description

6.4.1.1 Ecoregions and Biomes

Uzbekistan is located at the junction of several different bio-geographical regions. It has a variety of landscapes, including high mountain ranges, wetlands, and the infamous Aral Sea. Almost 85% of Uzbekistan's territory is occupied by desert or semi-desert, including the largest arid zones in Central Asia: the Kyzyl-Kum, and the Ustyrt Plateau. About 10% of Uzbekistan's land (mostly in the Fergana Valley), is classified as arable, and 0.8% is planted with permanent agricultural crops. About 0.4% is forested. The rest is mostly occupied by deserts.

6.4.1.2 Biodiversity

Kashkadarya Region Overview

Semi-desert and desert plants dominate vegetation in the undeveloped territories in the west of the Region. Unoccupied areas in Nishan steppe support ephemeroid sagebrush vegetation and ephemeral-ephemeroid associations. The main plant types on clayey soil are sagebrush, salsola, milfoil, convolvulus, and grasses. Ephemeral-ephemeroid graminoids and few salsola species are of certain forage value. The widely spread grass species are actively vegetating bluegrass, dandelions, as well as sagebrush, coach grass, and wild carrot. Salt bush, sagebrush, Syrian mesquite, and camelthorn are encountered within river flood valleys and along irrigation canals.

The west of Kashkadarya Region is prone to adverse weather phenomena, such as garmsil or dry hot wind. To reduce the risk of loss of crops, all fields are surrounded by windbreak belts comprising planted mulberry, plane tree, poplar, acacia, and fig plants. Notably, plane tree and fig are recorded in the Red Data Book of Uzbekistan.

Forty plant species that are present in Kashkadarya Region (mostly in mountainous areas) are listed in the national Red Data Book.

Tulipa micheliana, *Tulipa ingens*, *Allium ophiophyllum*, *Crambe gordjaginii* may be encountered within the Project area.

According to file materials, the Region's flat areas provide habitat for red ground squirrel, jerboa, great gerbil, lizard, monitor, snake, wolf, fox, and Persian gazelle. Notably, larger animals (e.g. monitors, wolves, foxes, Persian gazelles) are encountered only in undeveloped desert areas in the west and south-west of the Region.

Due to its size and central location between Europe and Asia, Uzbekistan is host to a diverse avifauna (birds) with an estimated total of about 500 species, which is similar to bird species number in Europe[64]. Uzbekistan, Kazakhstan and Turkmenistan are areas of several migration routes, including the Black Sea – Mediterranean, West Asian - East African, and Central Asian - South Asian flyways. Thus, large numbers of birds, particularly wildfowl, raptors and cranes, visit this area for stop-over during their annual migrations.

Within Uzbekistan there are 47 Important Bird Areas (**IBAs**) including the Talimarjan reservoir (water source for Kashkadarya Project area) and Aidar-Arnasay lake system (drainage water receiving water body in Syrdarya Region). Studies undertaken in the vicinity of these water bodies the last years have confirmed that the area is important for migratory bird species in both spring and winter migration periods.

Outputs of the avifauna studies conducted for the ESIA process in August 2019 are presented in this Section below.

[64] Kh.S. Salikhbaev, M.M Ostapenko. Birds // Ecology, measures on protection and rational use of vertebrates of the Karshi steppe. Tashkent, 1967.

Syrdarya Region Overview

Most flat areas in Syrdarya Region are occupied by oases where natural vegetation is displaced by cultivated plants. Natural vegetation remains only in areas that are of little or no use, in topographic lows occupied by solonchaks (various salsola species), and in wetland parts of Syr Darya River flood valley (reed, sedge).

Ephemeral-ephemeroid graminoids and few salsola species are of certain forage value.

Agriculture is an important sector in Syrdarya Region. Farmland occupy more than a half of the total arable land area. Over 50 per cent of crop fields are irrigated. Two thirds of the Region's farmland areas are occupied by pastures. Sheep farming is developed in desert areas of Syrdarya Region.

Irrigated cotton farming is the leading agricultural sector. Vegetable, melon cultivation, gardening, and vine growing play an important role in suburban areas. The main crops in irrigated land are wheat, barley, and panic grass.

Protected plant species which may be encountered in Chardara area in the north of Syrdarya Region include *Bryonia melanocarpa* (Cucurbitaceae). This lianoid perennial herbaceous plant grows on fixed low-mound sand within Calligonum-Haloxylon persicum associations.

According to file materials, the Region provides habitat for the following mammals: house mouse, grey rat, gerbil, mole lemming, common bat, eared hedgehog, lesser white-toothed shrew, yellow souslik, marbled polecat, jackal, and fox. The birds are represented by field sparrow, Indian sparrow, loughing dove, barn swallow, black swift, mynas, desert bullfinch, Syke's warbler, turtle dove, blue-cheeked bee-eater, Egyptian nightjar, crested lark, roller, whoop, black-headed shrike, and little owl. The Region's reptiles include naked-toed gecko, desert lidless skink, rapid fringe-toed lizard, steppe agama, mountain racer, cliff racer, and Dione snake. Animals that may be encountered in forests on the Syr Darya River banks include lynx, wild boar, musk rat, as well as birds - such as pheasants, ducks, and geese.

6.4.2 Results of Flora and Vegetation Survey

Botanical survey as part of the ESIA was conducted in the second part of August 2019 within the territories allocated for fields, warehouses, gins and other facilities of FE "Indorama Agro" LLC. Project location and the botanical survey points are indicated in the figures below.

6.4.2.1 Methodology

Survey for vascular plants was undertaken in August 2019 at twelve sites in both regions. Habitats of interest were pre-selected during the Scoping Site Visit and satellite images study. It should be noted that the study of vegetation was carried out in late summer, when many plant species are non-available for correct determination of the species and protective cover.

Flora and Vegetation

The floristic and geobotanical survey covered a number of survey plots positioned along 10-100 m transects including the predominant habitats of the Project area. The botanical survey was performed using the transect (route) method, with recording of plant species in different layers, projective cover, and vital power. Survey plots were positioned within the most common vegetation communities.

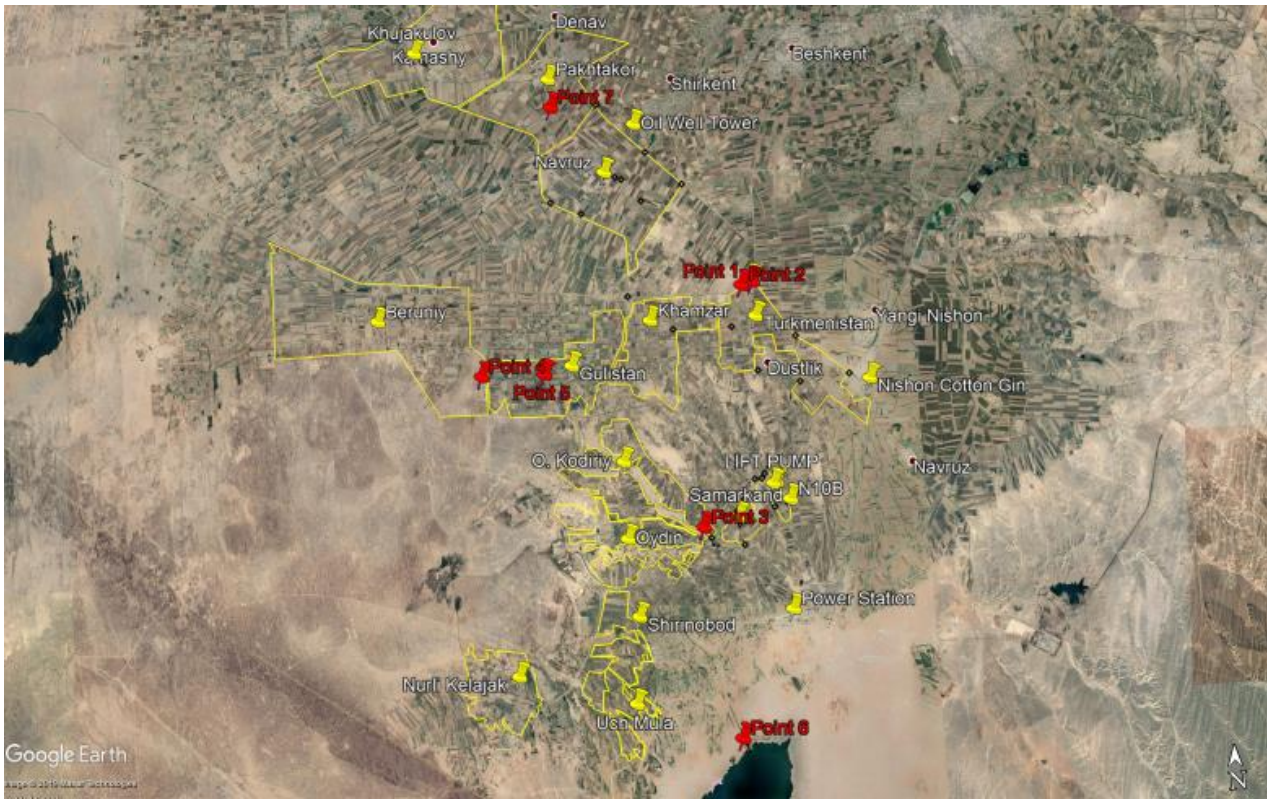
Names of the species were specified by S. Cherepanov overview[65] (1995). Vegetation communities were identified according to V. Vasylevich[66] (1971).

[65] Cherepanov, Vascular plants of Russia and neighbouring countries within the ex USSR, Saint-Petersburg, 1995.
[66] V. Vasylevich, Methods of identification of vegetation associations, Leningrad, Nauka, 1971.

For consistency of results and their comparability with data of previous surveys, species projective cover was assessed using the following scale (B. Mirkin, G. Rosenberg)[67]:

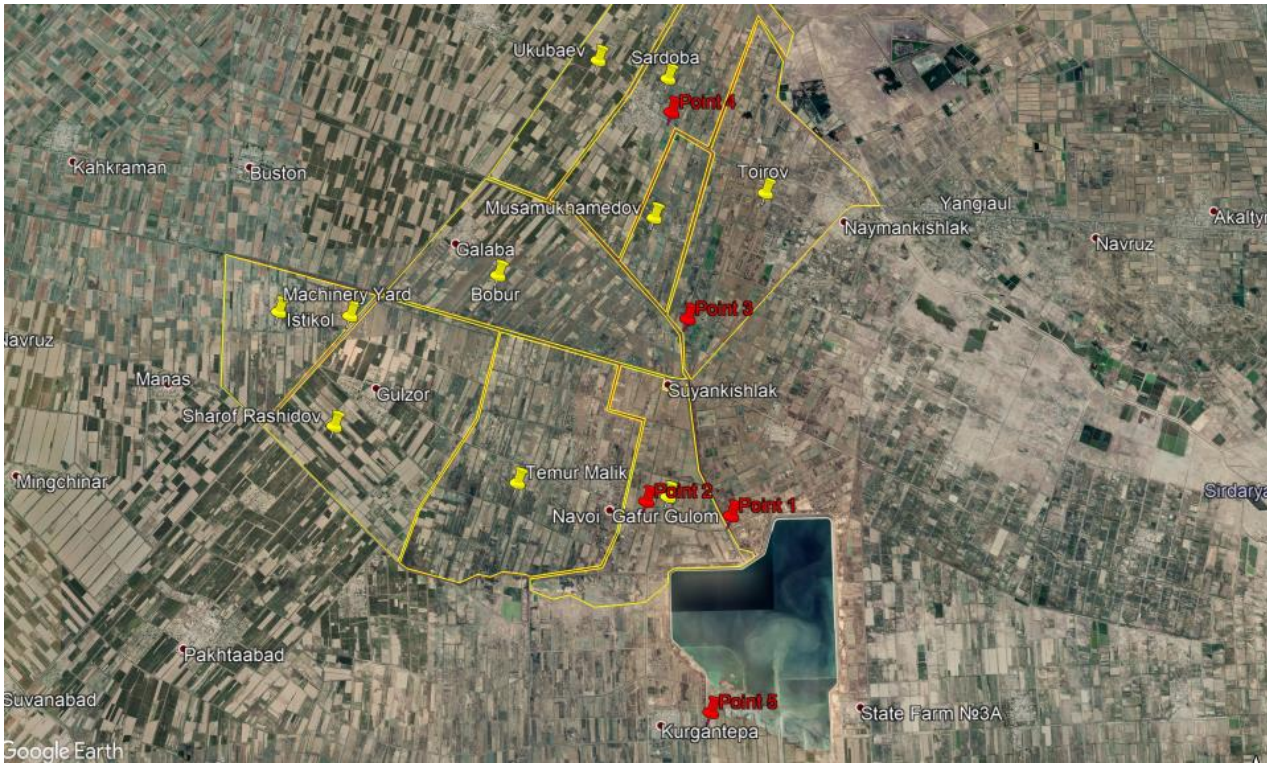
- r = a single species with insignificant cover
- + = a rare species with cover of up to 1%
- 1 = species with cover between 1% and 5%
- 2 = species cover between 6% and 25%
- 3 = species cover between 26% and 50%
- 4 = species cover between 51% and 75%
- 5 = species cover over 75%.

Map 6.5: Kashkadarya region



[67] B. Mirkin, G. Rosenberg, Phytoecology. Principles and Methods, Leningrad, Nauka, 1978.

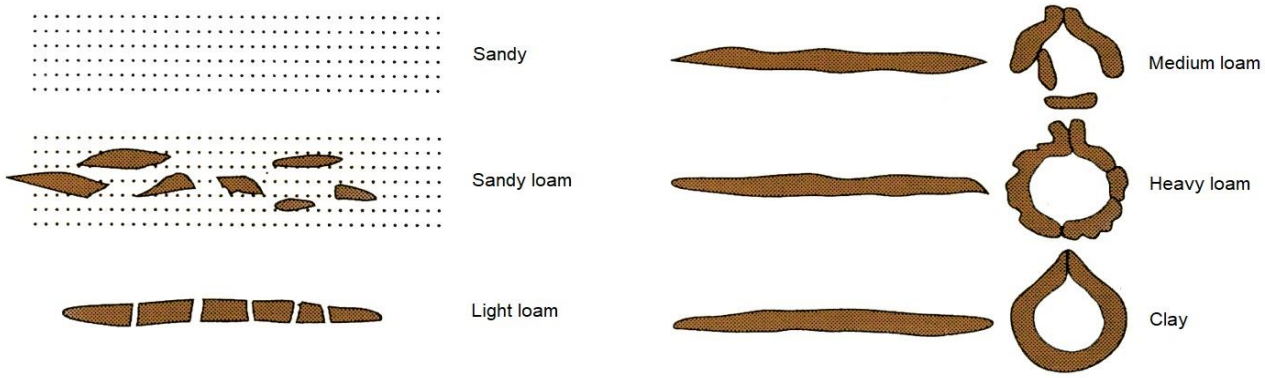
Map 6.6: Syrdarya region



Soil Composition

Soil mechanical composition and presence of salinity was assessed using the “Rope method” of N. Kachinsky (see Table 6.7)[68]. Soil finger prints of made at all points of the botanical survey.

Figure 6.6: Soil composition



Source: N. Kachinsky, Soil classification, mechanical content of soils, methods of surveys

[68] N. Kachinsky, Soil classification, mechanical content of soils, methods of surveys, Academy of Science of the USSR, 1958.

6.4.2.2 Survey Results

Flora

90 species of 34 families were found during the survey. The list of recorded species in Latin and Russian is presented below.

Table 6.24: Flora survey species

Species	
Latin	**Russian**
Amaranthaceae	**Амарантовые**
Amaranthus blitoides S. Watson	Щирица жминдовидная
Amaranthus retroflexus L.	Щирица запрокинутая
Halocnemum strobilaceum (Pall.)	Сарсазан шишковатый
Anacardiaceae	**Сумаховые**
Rhus glabra L.	Сумах голый
Asteraceae	**Астровые**
Artemisia scotina Nevski	Полынь темная
Sonchus arvensis L.	Осот полевой
Artemisia serotina Bunge	Полынь поздняя
Artemisia vulgaris L.	Полынь обыкновенная
Xanthium spinosum L.	Дурнишник колючий
Xanthium albinum (Widder) Scholz & Sukopp	Дурнишник эльбский
Carthamus turkestanicus Popov	Сафлор туркестанский
Carthamus oxyacanthus Bieb.	Сафлор острошипый
Cousinia resinosa Juz.	Кузиния смолистая
Crepis aculeata (DC.) Boiss. (?)	Скерда колючая (?)
Lactuca tatarica (L.) C.A. Mey.	Латук татарский
Crepis tectorum L.	Скерда кровельная
Bidens tripartita L.	Череда трёхраздельная
Inula britannica L. (?)	Девясил британский (?)
Conyza canadensis (L.) Cronquist	Мелколепестничек канадский
Erigeron pseudoseravschanicus Botsch.	Мелколепестник ложнозеравшанский
Helianthus annuus L.	Подсолнечник однолетний
Caryophyllaceae	**Гвоздичные**
Silene sp.	Смолёвка sp.
Ceratophyllaceae	**Роголистниковые**
Ceratophyllum demersum L.	Роголистник погружённый
Chenopodiaceae	**Маревые**
Suaeda altissima (L.) Pall.	Сведа высочайшая
Chenopodium album L.	Марь белая

Species

Latin	Russian
Atriplex ornata Iljin	Лебеда украшенная
Salsola dendroides Pall.	Солянка древовидная
Bassia scoparia (hort. ex Voss) S. L. Welsh	Бассия веничная
Atriplex tatarica L.	Лебеда татарская
Convolvulaceae	**Вьюнковые**
Convolvulus arvensis L.	Вьюнок полевой
Calystegia sepium (L.) R. Br.	Повой заборный
Cucurbitaceae	**Тыквенные**
Cucurbita pepo L.	Тыква обыкновенная
Melo sativus Sageret ex M. Roem.	Дыня посевная
Cyperaceae	**Сытевые**
Pycreus flavescens (L.) P. Beauv. ex Rchb. (?)	Ситовник желтоватый (?)
Bolboschoenus maritimus (L.) Palla	Клубнекамыш морской
Elaeagnaceae	**Лоховые**
Elaeagnus orientalis L.	Лох восточный
Fabaceae	**Мотыльковые**
Lagonychium farctum (Banks & Sol.) Bobrov	Мимозка выполненная
Alhagi pseudalhagi (M. Bieb.) Fisch.	Верблюжья колючка
Trifolium pratense L.	Клевер луговой
Haloragaceae	**Сланоягодниковые**
Myriophyllum spicatum L.	Уруть колосистая
Hydrocharitaceae	**Водокрасовые**
Vallisneria spiralis L.	Валлиснерия спиральная
Juncaceae	**Ситниковые**
Juncus effusus L.	Ситник развесистый
Lamiaceae	**Яснотковые**
Mentha asiatica Boriss.	Мята азиатская
Phlomis thapsoides Bunge	Зопник коровяковидный
Lythraceae	**Дербенниковые**
Lythrum salicaria L.	Дербенник иволистный
Malvaceae	**Мальвовые**
Gossypium hirsutum L.	Хлопчатник жёстковолосистый
Lavatera thuringiaca L.	Хатьма тюрингийская?
Moraceae	**Тутовые**
Morus nigra L.	Шелковица чёрная
Ficus carica L.	Смоковница обыкновенная

Species

Latin	Russian
Najadaceae	**Наядовые**
Najas marina L.	Наяда морская
Onagraceae	**Ослинниковые**
Epilobium palustre L.	Кипрей болотный
Plantaginaceae	**Подорожниковые**
Plantago major L.	Подорожник большой
Plantago lanceolata L.	Подорожник ланцетный
Platanaceae	**Платановые**
Platanus acerifolia (Aiton) Willd.	Платан клёнолистный
Plumbaginaceae	**Свинчатковые**
Limonium myrianthum (Schrenk) Kuntze	Кермек тысячецветковый
Poaceae	**Мятликовые**
Setaria viridis (L.) P. Beauv.	Щетинник зелёный
Avena sativa L.	Овес посевной
Phleum pratense L.	Тимофеевка луговая
Festuca arundinacea Schreb.	Овсяница тростниковая
Eremopyrum orientale (L.) Jaub. & Spach	Мортук восточный
Digitaria sanguinalis (L.) Scop.	Росичка кроваво-красная
Phragmites australis (Cav.) Trin. ex Steud.	Тростник южный
Saccharum officinarum L.	Сахарный тростник благородный
Phleum pratense L.	Тимофеевка луговая
Agrostis stolonifera L.	Полевица побегообразующая
Setaria viridis (L.) P. Beauv.	Щетинник зелёный
Bromopsis inermis (Leyss.) Holub	Кострец безостый
Echinochloa crus-galli (L.) P. Beauv.	Ежовник обыкновенный
Elytrigia repens (L.) Nevski	Пырей ползучий
Triticum durum Desf.	Пшеница твёрдая
Poa bulbosa ssp. vivipara (Koeler) Arcang.	Мятлик курчавый
Polygonaceae	**Гречишные**
Polygonum aviculare L.	Спорыш птичий
Rumex sp.	Щавель sp
Portulacaceae	**Портулаковые**
Portulaca oleracea L.	Портулак огородный
Potamogetonaceae	**Рдестовые**
Potamogeton perfoliatus L.	Рдест пронзённолистный
Potamogeton pectinatus L.	Рдест гребенчатый

Species

Latin	Russian
Rosaceae	**Розоцветные**
Malus domestica Borkh.	Яблоня домашняя
Prunus domestica L.	Слива домашняя
Salicaceae	**Ивовые**
Populus pruinosa Schrenk	Туранга сизая
Salix triandra L. (?)	Ива трёхтычинковая (?)
Populus deltoides Marshall	Тополь дельтовидный
Populus alba L.	Тополь белый
Solanaceae	**Пасленовые**
Solanum nigrum L.	Паслён чёрный
Hyoscyamus niger L.	Белена чёрная
Tamaricaceae	**Тамариксовые**
Tamarix ramosissima Ledeb.	Гребенщик ветвистый
Typhaceae	**Рогозовые**
Typha laxmannii Lepech. (?)	Рогоз Лаксмана (?)
Typha angustifolia L.	Рогоз узколистный
Ulmaceae	**Вязовые**
Ulmus parvifolia Jacq.	Вяз мелколистный
Zygophyllaceae	**Парнолистниковые**
Zygophyllum jaxarticum Popov	Парнолистник сырдарьинский

Source: Mott MacDonald

Vegetation and Soil

Soil composition was evaluated in each surveyed point and each biotope. The surveys identified that soil in both regions is loamy, with variable sand contents (see soil prints in Figure 6.7 below).

Figure 6.7: Soil composition

Source: Mott MacDonald

The main dominant communities of plants in both regions are Alhagi pseudalhagi, Xanthium spinosum, *Salsola dendroides*, *Tamarix ramosissima*, and *Lagonychium farctum* in Kashkadarya region.

Few trees of *Platanus acerifolia* and *Ficus carica* listed in the Red Data Book of the Republic of Uzbekistan were found in both regions. Although those trees were planted by man, appropriate conservation measures should be included in the Construction Environmental and Social Management Plan, to prevent the trees loss or damage due to the construction activities.

Photo log of the plants and plant communities is represented in Volume III.

6.4.3 Avia Fauna Survey Results

6.4.3.1 Kashkadarya region

158 species of 22 families of birds are registered in the Karshi steppe territory. Many species in the Karshi steppe are not typical inhabitants of deserts and nest near of water bodies. Ten species of birds are permanent inhabitants of this area and 80 species are migratory birds.

22 species of birds found in the Karshi steppe are included in the Red Book of the Republic of Uzbekistan, of which 15 species are listed on the IUCN Red List. These are a white-bellied grouse, a bustard, a nesting bird, a white-headed vulture, a black vulture, a snake-eater and a dwarf eagle, a small cormorant, a strep, a white-eyed duck, curly pelican, steppe harrier, burial ground, gyrfalcon, and tailed eagle.

Table 6.25: Red book species of birds in Kashkadarya region

Latin name	Russian name	Red Book	UNCN	Habitation status
Pelecanus onocrotalus	Пеликан	2(VU:D)		Transit
Pelecanus crispus	Кудрявый пеликан	2(VU:D)	[LR-cd]	Transit
Phalacrocorax pygmaeus	Малый баклан	3(NT)	[LR-nt]	Transit
Ciconia ciconia	Белый аист	3(NT)		Transit
Phoenicopterus roseus	Фламинго	2(VU:R)		Transit
Cygnus olor	Лебедь - шипун	3(NT)		Transit
Cygnus Cygnus	Лебедь - кликун	2(VU:R)		Transit
Anser erythropus	Пискулька	2(VU:R)	[VU]	Transit
Aythya nyroca	Белоглазый нырок	3(NT)	[LR-nt]	Transit
Gyps fulfus	Белоголовый сип	3(NT)		Stopover
Aegypius monachus	Черный гриф	3(NT)	[LR-nt]	Stopover
Circaetus gallicus	Змееяд	2(VU:D)		Stopover
Circus macrourus	Степной лунь	3(NT)	[LR-nt]	Transit
Haliaeetus albicilla	Орлан - белохвост	2(VU:R)	[LR-nt]	Wintering
Haliaeetus leucoryphus	Орлан - долгохвост	1 (EN)	[VU]	Transit
Aquila heliaca	Могильник	2(VU:D)	[VU]	Transit
Hieraaetus pennatus	Орел- карлик	2(VU:D)		Stopover
Falco cherrug	Балобан	3(NT)		Wintering
Tetrax tetrax	Стрепет	2(VU:D)	[LR-nt]	Transit
Chlamidotis undulate	Дрофа- красотка	2(VU:D)	[LR-nt]	Nesting, Transit
Chettusia gregaria	Кречетка	2(VU:R)	[VU]	Transit
Pterocles alchata	Белобрюхий рябок	2(VU:D)		Nesting, Transit
Larus ichthyaetus	Черноголовый хохотун	2(VU:D)		Transit Wintering

Source: Ekostandart

Talimarjan water reservoir is located 45 km from Karshi to the south of Nishon district. This water reservoir is an Important Bird Area (IBA № UZ023) with the following IBA criteria:

- Globally threatened species – A1
- Number of birds of globally threatened species is insufficient to apply criterion A
- A4i 1% or more of biotic population
- A4iii - more than 20000 of aquatic or semiaquatic birds.

Table 6.26: Red book species of birds of Talimarjan water reservoir

Latin name	Russian name	IBA criteria
Aythya nyroca	Белоглазый нырок	A1
Chlamidotis undulata	Дрофа-красотка	A1*
Ancer ancer	Серый гусь	A4i
Anas plathyrhynchos	Кряква	A4i
Pelecanus onocratalus	Розовый пеликан	Red Book
Phalacrocorax pygmaeus	Малый баклан	Red Book
Haliaeetus albicilla	Орлан-белохвост	Red Book
Larus ichthyaetus	Черноголовый хохотун	Red Book

Results of Field Survey

To assess the impact on the avifauna in result of the gins and grid construction, ornithological survey was carried out at the Project area during a short-term expedition from September 13 to 15, 2019. During the survey time, the weather conditions were favorable: the weather was sunny, slightly windy, temperature +30 - +32 C.

During survey in the project area and adjacent sites, 39 bird species were found, including rare Circus macrourus listed in the Red Book of the Republic of Uzbekistan and globally threatened (INCN). The list of bird species found is given in the tables below.

Table 6.27: Indicated bird species, Kasbi area

Latin name	Russian name
Circus aeruginosus (Linnaeus, 1758)	Болотный лунь
Buteo rufinus (Cretzschmar, 1827)	Курганник
Falco tinnunculus (Linnaeus, 1758)	Обыкновенная пустельга
Sterna hirundo(Linnaeus, 1758)	Речная крачка
Columba livia (Gmelin, 1789)	Сизый голубь
Streptopelia decaocto (Frivaldszky, 1838)	Кольчатая горлица
Streptopelia senegalensis (Linnaeus, 1766)	Малая горлица
Coracias garrulus (Linnaeus, 1758)	Сизоворонка
Merops apiaster (Linnaeus, 1758)	Золотистая щурка
Merops superciliosus (Linnaeus, 1758)	Зеленая щурка
Upupa epops (Linnaeus, 1758)	Удод
Galerida cristata (Linnaeus, 1758)	Хохлатый жаворонок
Calandrella cineria (Gmelin,1789)	Малый жаворонок
Hirundo rustica (Linnaeus, 1758)	Деревенская ласточка

Motacilla personata (Gould, 1861)	Маскированная трясогузка
Motacilla feldegg (Michhelles,1830)	Черноголовая трясогузка
Lanius isabellinus (Hemprich et Ehrenberg,1833)	Рыжехвостый жулан
Lanius schach (Linnaeus, 1758)	Длиннохвостый сорокопут
Sturnus vulgaris (Linnaeus, 1758)	Обыкновенный скворец
Acridotheres tristis (Linnaeus, 1766)	Майна
Pica pica (Linnaeus, 1758)	Сорока
Corvus monedula (Linnaeus, 1758)	Галка
Corvus frugilegus (Linnaeus, 1758)	Грач
Corvus corone (Linnaeus, 1758)	Черная ворона
Acrocephalus arudinaceus (Hemprich et Ehrenberg,1833)	Дроздовидная камышевка
Hippolais rama (Sykes,1832)	Южная бормотушка
Sylvia althaea (Hume, 1878)	Славка - завирушка
Phylloscopus collybitta (Vieillot,1817)	Пеночка - теньковка
Saxicola torquata (Linnaeus, 1766)	Черноголовый чекан
Oenanthe pleschanka (innaeus, 1758)	Каменка - плешанка
Passer hispaniolensis (Temminck,1820)	Черногрудый воробей
Passer montanus (Linnaeus, 1758)	Полевой воробей
Passer indicus (Jardine et selby,1831)	Индийский воробей

Source: Ekostandart

Table 6.28: Indicated bird species, Nishan area

Latin name	Russian name
Circus macrourus (Gmelin, 1771) (Red book, UNCN)	**Степной лунь**
Circus aeruginosus (Linnaeus, 1758)	Болотный лунь
Buteo rufinus (Cretzschmar, 1827)	Курганник
Falco tinnunculus (Linnaeus, 1758)	Обыкновенная пустельга
Columba livia (Gmelin, 1789)	Сизый голубь
Streptopelia decaocto (Frivaldszky, 1838)	Кольчатая горлица
Streptopelia senegalensis (Linnaeus,1766)	Малая горлица
Athene noctua (Scopoli,1796))	Домовый сыч
Coracias garrulus (Linnaeus, 1758)	Сизоворонка
Merops apiaster (Linnaeus, 1758)	Золотистая щурка
Merops superciliosus (Linnaeus, 1758)	Зеленая щурка
Upupa epops (Linnaeus, 1758)	Удод
Galerida cristata (Linnaeus, 1758)	Хохлатый жаворонок
Calandrella cineria (Gmelin,1789)	Малый жаворонок
Melanocorypha calandra (Linnaeus, 1766)	Степной жаворонок

Melanocorypha bimaculata (Menetries,1832)	Двупятнистый жаворонок
Alauda arvensis (Linnaeus, 1758	Полевой жаворонок
Hirundo rustica (Linnaeus, 1758)	Деревенская ласточка
Motacilla personata (Gould, 1861)	Маскированная трясогузка
Motacilla feldegg (Michhelles,1830)	Черноголовая трясогузка
Lanius isabellinus (Hemprich et Ehrenberg,1833)	Рыжехвостый жулан
Acridotheres tristis (Linnaeus, 1766)	Майна
Pica pica (Linnaeus, 1758)	Сорока
Acrocephalus arudinaceus (Hemprich et Ehrenberg,1833)	Дроздовидная камышевка
Hippolais rama (Sykes,1832)	Южная бормотушка
Sylvia althaea (Hume, 1878)	Славка - завирушка
Sylvia nana (Hemprich et Ehrenberg,1833)	Пустынная славка
Saxicola torquata (Linnaeus, 1766)	Черноголовый чекан
Oenanthe isabellina (Temminck,1825)	Каменка - плясунья
Passer 45hispaniolensis (Temminck,1820)	Черногрудый воробей
Passer montanus-(Linnaeus, 1758)	Полевой воробей
Rhodospiza obsoleta (Lichtenshtein,1832)	Буланый вьюрок

Source: Ekostandart

6.4.4 Threatened Species

According to the IUCN's 2008 Red List of Threatened Species, there are 52 critically endangered / endangered / vulnerable species in Uzbekistan. Further 415 species are under a lower risk, and the data for five species are insufficient. In 2006 Uzbekistan published their national Red Data Book which partially overlaps with the 2008 International Red List, being more stringent in some instances.

6.4.5 Designated Nature Conservation Areas

Uzbekistan's current designated conservation areas fall into five categories: nature reserves/national reserves (zapovedniks); national parks; one ecological centre; wildlife areas (zakazniks); and landmarks[69] No designated conservation areas are present within 50 km of the Project sites.

6.4.5.1 Kashkadarya Region

There are no designated nature conservation areas within the Project area in Kashkadarya Region. The nearest conservation areas are the Hissar Mountain Forest National Reserve and Kitab Geological and Mountain Forest Reserve located in the north-east of the Region, at a distance of 160 km from the Project sites.

The Hissar Reserve includes areas on the western slopes of Hissar Range, within the elevation range of 1750 to 4,349 m above sea level. The reserve has a boundary with Sukhadarya Region of Uzbekistan in the east and south-east, along the Hissar range crest, and borders Tajikistan in the north.

[69] Environmental Performance Review – Uzbekistan. Second Review. UN, 2010

The Hissar Reserve was established in 1983 through a merger of two different mountain natural reserves - Kyzyl-Sui and Mirakin. Both merged reserves had significant territories, therefore the Hissar Reserve is Uzbekistan's largest existing nature conservation area – 81,000 ha.

The Kitab Reserve is the only conservation area managed by the State Committee for Geology and Mineral Resource of the Republic of Uzbekistan. It was established specifically for protection of unique stratigraphic successions and remains of fossil animals and plants that them contain. The Palaeozoic sections include peculiar geological features that contain a wealth of unique information on the Earth's geological history over a significant period of time of 130-170 million years. Also, the reserve has a special role for conservation of flora and fauna. It occupies the area of 40,000 ha.

6.4.5.2 Syrdarya Region

No nature conservation areas are present in Syrdarya Region. The nearest conservation area is Zaamin Mountain Juniper Reserve located 95-98 km to the south-west.

6.4.6 Methodology and Assessment Criteria

The Project is required to meet the following international third party and lender standards and requirements:

- IFC PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- EBRD PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

The standards that include specific requirements to biodiversity and ecosystem services are IFC PS6 and EBRD PR6. These requirements are described in more detail below.

6.4.6.1 IFI PS 6

The impact assessment for this ESIA follows the revised IFC PS6 on biodiversity conservation and sustainable management of living natural resources. IFC PS6 is intended to:

- Protect and conserve biodiversity;
- Maintain the benefits from ecosystem services; and
- Promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

The IFC PS6 includes a requirement that a conservation value is allocated to ecological features (protected areas, habitats and species) which are likely to be directly or indirectly impacted by the Project within an area of influence. Under the IFC guidance, the requirements of PS6 apply to projects in all habitats, whether or not those habitats have been previously disturbed and whether or not they are legally protected.

In accordance with IFC PS6, habitats are divided into modified, natural and critical habitats. Critical habitats can be either modified or natural habitats supporting high biodiversity value, including:

- Habitat of significant importance to critically endangered and/or endangered species (IUCN Red List);
- Habitat of significant importance to endemic and/or restricted-range species;
- Habitat supporting globally significant concentrations of migratory species and/or congregatory species;
- Highly threatened and/or unique ecosystems and/or;
- Areas associated with key evolutionary processes.

Habitat destruction is recognised as a major threat to conservation of biodiversity, and to assess likely significance of the impacts, PS6 provides the following recommendations depending on habitat status:

Modified Habitat: exercise care to minimise any conversion or degradation of such habitat, depending on scale of project, identify opportunities to enhance habitat and protect and conserve biodiversity as part of operations.

Natural Habitat: developer will not significantly convert or degrade such habitat unless no financial/technical feasible alternatives exist (or overall benefits outweigh cost), stakeholders have been consulted, and conversion or degradation is suitably mitigated following the mitigation hierarchy.

Mitigation measures need to achieve no net loss of biodiversity where feasible.

Critical Habitat: in areas of critical habitat the developer will not implement project activities unless: there are no alternatives; there are no measurable adverse impacts on the critical habitat triggers; project does not lead to a net reduction in the populations of critically endangered or endangered species; and a robust, appropriately designed and long-term monitoring and evaluation programme is implemented. Developers must achieve net gain in biodiversity if critical habitats are affected. The preparation and implementation of a Biodiversity Action Plan (BAP) is required where critical habitat is affected.

The IFC PS6 now recognises the importance of ecosystem services. Where a project is likely to adversely impact ecosystem services, as determined by the impact assessment process, a systematic review to identify priority ecosystem services must be carried out, any impacts on Affected Communities must be identified, and impacts on the ecosystem services minimised.

6.4.6.2 European Bank for Reconstruction and Development (EBRD) Standards

As part of its Environmental and Social Policy, EBRD (2014) has adopted a comprehensive set of specific PRs that projects are expected to meet. Furthermore, EBRD is committed to promoting EU environmental standards as well as the European Principles for the Environment, which are reflected in the PRs.

EBRD PR6 “Biodiversity Conservation and Sustainable Management of Living Natural Resources” is the relevant requirement for the Project. PR6 applies to projects in all kinds of habitats, irrespective of whether they have been disturbed or degraded previously, or whether or not they are protected or subject to management plans. The objectives of PR6 are to:

- Protect and conserve biodiversity using a precautionary approach;
- Adopt the mitigation hierarchy approach, with the aim of achieving no net loss of biodiversity, and where appropriate, a net gain of biodiversity; and
- Promote good international practice in the sustainable management and use of living natural resources.

6.4.6.3 Zone of Influence for Biodiversity

Current guidance on ecological assessments recommends that all ecological features that occur within a zone of influence around the proposed development are examined (IEEM, 2006). The potential Zone of Influence (**ZoI**) includes:

- Areas directly within the land take for the proposed development and access;
- Areas which will be temporarily affected during construction;
- Areas likely to be impacted by hydrological disruption; and
- Areas where there is a risk of pollution and noise disturbance during construction and/or operation

With regard to biodiversity and nature conservation, the ZoI for the Project includes the following:

- The Project footprint and surrounding habitats to 500 m
- Designated conservation areas within 20 km from the Project; and
- Protected and or notable species within 2 km of the Project.

6.4.6.4 Determining Sensitivity and Magnitude

In accordance with IFC PS6, the conservation value (sensitivity) or weighting attributed to each ecological feature which occurs within the ZoI of the Project needs to be undertaken, and these are defined in Table 6.29.

Table 6.29: Criteria for determining conservation value (sensitivity of the receiving environment)

Conservation value (sensitivity)	Species criteria	Habitat or Site Criteria
Very High	IUCN Critically endangered and endangered species.	Internationally designated sites (or equal status). Critical habitats of significant international ecological importance.
High	IUCN Vulnerable species. European species and nationally protected species of significant population size and importance.	Nationally designated sites (or equal status). Areas of critical habitats of national ecological importance, and natural habitats of significant ecological importance and/or high biodiversity with limited potential for substitution.
Medium	IUCN Near Threatened species. Nationally protected species or rare species, but not a significant population size and not of national importance.	Regionally important natural habitats. Natural habitats. Modified habitats with high biodiversity or under significant threat of loss within the region.
Low	IUCN Least Concern. Species of local national importance.	Undesignated sites and natural habitats of some local biodiversity and cultural heritage interest. Modified habitats with limited ecological value. Other sites with little or no local biodiversity and cultural interest. Modified habitats with limited biodiversity value.
Negligible	IUCN Least Concern species. Species of no national importance.	Highly modified habitats of no or very limited biodiversity value.

The magnitude of the potential impacts upon each feature is then assessed for the construction and operation of the Project.

Table 6.30: Criteria for determining impact magnitude

Magnitude (positive or negative)	Definition (considers duration of the impact, spatial extent, reversibility and ability of comply with legislation)
Major	Fundamental change to the specific environmental conditions assessed resulting in long term or permanent change, typically widespread in nature (regional national and international), would require significant intervention to return to baseline; exceed national standards and limits.
Moderate	Detectable change to the specific environmental conditions assessed resulting in nonfundamental temporary or permanent change.
Low	Detectable but minor change to the specific environmental conditions assessed.
Negligible	No perceptible change to the specific environmental conditions assessed.

6.4.6.5 Determination of Significance

The significance has been determined by the interaction between the magnitude of impacts and the sensitivity of receptors affected, as depicted in the significance matrix presented in Section 3.

For each aspect, the significance of impacts will be discussed before and after mitigation (i.e. residual impact). Impacts identified as having major or moderate significance based on the above approach are classified as significant impacts.

As part of the impact assessment, appropriate mitigation measures are reviewed and included to minimise any potential adverse impacts of the Project on biodiversity. The residual impacts are then determined.

6.4.6.6 Assessment of Cumulative Impacts

Cumulative impacts are those impacts that may result from the combination of past, present or future actions of existing or planned activities in a project's ZoI. While a single activity may itself result in an insignificant impact, it may, when combined with other impacts (significant or insignificant) in the same geographical area and occurring at the same time, result in a cumulative impact that is significant.

The assessments within this document include, where relevant, an assessment of the cumulative impact of the Project with other present and planned developments in the ZoI.

6.4.6.7 Biodiversity Mitigation and Monitoring

Mitigation measures detailed in the ESIA have been developed around international best practice and adherence to the general requirements for biodiversity conservation in Uzbekistan. The mitigation measures proposed follow the mitigation hierarchy as defined within IFC PS6: avoid, reduce (minimise), remedy (restore) and offset. The biodiversity approach in this ESIA is the following:

- 'No net loss' of biodiversity
- Ecosystems services approach
- Seek sustainable use of biodiversity resources
- Ensure equitable sharing of biodiversity resources
- Apply the precautionary principle, and
- Take a participatory approach.

6.4.6.8 Data Limitations

The ecological surveys only focused on the typical habitats and areas of ecological interest. The baseline surveys followed best practice survey techniques and used a series of transects across the ZoI. This provides statically robust coverage for the Project area.

6.4.7 Assessment of Impacts

This section describes the likely ecological impacts of the main activities associated with the Project before mitigation. The impacts are presented for each project phase i.e. construction, operation and decommissioning. Impacts on ecological features of negligible conservation importance are not assessed or discussed in this chapter.

6.4.7.1 Construction Impacts

During the Project construction, the potential impacts may include:

- Noise and light nuisance from construction activities affecting birds and mammals;
- Dust deposition around working areas affecting adjacent habitats;
- Increased risk of local pollution events due to use of construction vehicles affecting adjacent habitats;
- Local changes in air quality resulting from construction activities and increased vehicle movements through the area;
- Accidental introduction and dispersal of invasive species from construction activities;
- Temporary or permanent habitat loss during construction of new and rehabilitation of existing water canals; and
- Loss and damage of Red Book listed species of plants during site preparation works.

Due to the low or negligible sensitivity of species and adjacent habitats and minor to negligible impacts magnitude, the impact is considered to be negligible.

Protected Areas

Designated nature conservation areas (international or national designations) are located further than 5 km from the Project area and are extremely unlikely to be affected by the works. The sensitivity of the protected sites is considered to be medium or high. Given that impact magnitude is negligible, the impacts are considered to be negligible.

Sensitive Habitats

The Project sites consist of fields and disturbed ground. The habitats within the Project's ZoI are of low conservation value represented by weed vegetation and supressed semi-desert vegetation of inarable lands. Some additional vegetation clearance is likely to be required during the upgrading of the existing irrigation and drainage systems and change of fields configuration. However, these habitats are considered to be of low conservation value; the impacts of the works will be minor in magnitude, and therefore negligible.

Increased dust levels and deposition are likely during construction, but sensitive habitats and flora are unlikely to be affected given the location of the Project sites within an existing cleared area.

Notable Flora

The desk study indicates that mainly common species of flora are present in the ZoI. These are generally considered to be of low conservation value and of low sensitivity. Impacts on these locally important species are considered to be minor adverse in magnitude and the likely effects are assessed as negligible.

Two Uzbekistan Red Data Book species were recorded within the ZoI of the Project: Ficus carica and Platanus acerifolia. Their presence was recorded in the Project area. The direct impact will consist in removal of these trees during the upgrading of existing irrigation and drainage system and change of fields configuration. Indirect impacts on these species may include increased dust and disturbance through off-road driving. These species are considered to be of medium conservation value. Impacts of the works are considered to be minor adverse in magnitude; therefore, if all trees across of Project territory are to be saved, the effect is minor adverse and negligible.

6.4.7.2 Operation Impacts

Nature Conservation Areas

The risk of designated conservation areas being affected during operation is considered to be negligible given the distance to the works area. Project impacts on protected areas during operation are therefore not expected to cause any significant effect (medium to high conservation value and negligible magnitude).

Habitats

There are no sensitive habitats on the Project sites and ZoI that would be affected during operation. The habitats that may be affected by accidental pollution (in the absence of mitigation) are of low and negligible conservation value, and impact magnitude is minor. Project effects on habitats are therefore negligible.

Flora

Two nationally threatened plant species are known to occur in the ZoI. Adverse impacts on these species could include pollution resulting from accidental spillage of chemicals, as described above, and damage due to traffic accidents. These impacts are likely to be minor, as agrochemicals will be stored and transferred within the Project sites, and movements of agricultural vehicles outside of roads will be limited. The sensitivity of these species to pollution and spillage is considered to be high. However, given that impacts are considered to be of negligible magnitude, the effect on nationally threatened species is not considered to be significant.

Fauna

The impacts on threatened mammal and bird species are considered to be negligible during operation since levelling, harvesting and other works will occur within the existing agricultural area, and air quality will not change notably compared to the baseline conditions.

6.4.7.3 Decommissioning Impacts

Protected Areas

No adverse impacts are likely on nature conservation areas during decommissioning, as all such areas are located more than 5 km off the project site. Project effects on protected areas during decommissioning have been assessed as not being significant.

Habitats

The Project site consists of bare and disturbed ground as the area has already been cleared. The habitats within the ZoI of the Project are of low conservation value. Impacts of decommissioning are expected to be minor in magnitude and therefore not likely to result in a significant effect.

Flora

Effects on threatened species of plants are unlikely to be significant during decommissioning. The magnitude of the impacts of decommissioning activities is likely to be negligible as no habitat will be lost during this phase.

Fauna

Impacts during decommissioning are likely to be similar to construction. The birds may be affected by noise and artificial lighting during decommissioning; these effects without mitigation are likely to be minor, and therefore negligible.

6.4.8 Mitigation Measures

Mitigation measures have been developed for key biodiversity features to ensure systematic application of the mitigation hierarchy, i.e. avoid, reduce (minimise), remedy (restore) and offset. This will allow for the careful management of risk, the best possible outcomes for the Project without compromising the health, function and integrity of the ecological systems. All effects are assessed as not significant because the biodiversity receptors are of low conservation value or the impact magnitude is negligible or minor. In line with EBRD PR6, the mitigation hierarchy should be implemented to achieve no net loss of biodiversity. Even if the habitats are classified as modified, IFC PS6 requires that impacts on biodiversity are minimised in modified habitat, and that in natural habitat the mitigation hierarchy is followed to achieve no net loss of biodiversity where feasible (IFC). The best practice measures presented below will help to further reduce the scale of the identified impacts.

Generic Mitigation Measures

The following generic mitigation measures will be applied under the Project:

- All construction and operational working areas will be kept to the minimum to reduce habitat loss and degradation;
- Access routes for construction and operational activities outside the existing cleared area (if required) will be kept to a minimum. Plans will be implemented to minimise all construction traffic activities outside the existing agricultural area. These actions will significantly reduce potential impacts on habitats and nuisance to wildlife;
- Artificial lighting used on construction sites and camps will be minimised, shaded and directed downwards to avoid light spillage and disturbance to birds and other wildlife.

- Noise disturbance and vibration will be kept to a minimum through such measures as ensuring proper maintenance of construction and agricultural machinery and equipment and complying with national standards;
- All workers engaged in the Project will be made aware of the environmental and ecological sensitivities on the project site and surrounding areas.

Habitats and Flora

There are no sensitive habitats likely to be affected by the works, but there are two nationally threatened species of plants in the vicinity of the Project sites. There is unlikely to be a significant impact on habitats and flora as the Project will be implemented in brownfield sites. Any potential impact on habitats and flora as a result of spillages and pollution will be mitigated as described below.

The Project design has considered and incorporated the use of existing infrastructure corridors in order to avoid or minimise habitat loss and degradation.

Pollution prevention and control

Pollution prevention and treatment measures will be implemented with regard to wastewater, as recommended in the following IFC Environmental, Health and Safety Guidelines:

- Conduct a spill risk assessment;
- Install secondary containment around vessels and tanks to contain accidental release;
- Develop corrosion maintenance and monitoring programme to ensure the integrity of all equipment;
- Ensure spill response and containment equipment is deployed or available for a response.

A Spill Response Plan will also be prepared and implemented to address potential agrochemical and fuel spills from facilities, vehicles, loading/unloading operations, and pipelines.

Birds

To minimise the potential impact to all breeding bird species, any further vegetation clearance will be undertaken outside of the bird nesting period (main breeding season is between March and July). Where clearance is not possible outside the breeding season, a check for breeding birds and active nests by a qualified ecologist will be undertaken 48 hours prior to vegetation clearance. If breeding birds are discovered, then works will be postponed in that area till the end of breeding cycle (this may take up to three weeks). A species-specific buffer zone (minimum 25 m) will be set up around the nest site.

The study area is located on several major global flyways for migratory land and waterbirds. The following best practice noise reduction measures will be implemented to reduce impacts on breeding or migrating birds during construction and operation:

- Avoidance of unnecessary revving of engines and switch off equipment when not required;
- Vehicles and equipment will be properly maintained to meet the manufacturers' noise rating levels. Any failed silencers or bearings will be replaced as soon as possible;
- Using enclosures for noisy plant such as pumps or generators;
- Limiting the use of particularly noisy plant or vehicles where practicable; and
- Plant and vehicles will be operated with noise control hoods closed.

Mammals

Habitat loss should be avoided, and where possible a phased vegetation clearance should be undertaken, to ensure animals are able to escape the works area during construction. Noise and disturbance should be minimized through best practice measures during construction and operation (see section above).

Non-native Invasive Species

Non-native (alien) invasive species are the second threat to the global biodiversity after habitat destruction.

IFC PS6 requires to introduce the following best practice measures with regard to Alien Invasive Species (**AIS**):

- No intentional introduction of *alien species* unless this is in accordance with existing national regulatory framework
- No deliberate introduction of AIS irrespective of national regulatory framework
- Introduction of alien species (e.g. in planting) must be subject to a risk assessment
- Implement measures to avoid accidental introduction or spreading of alien species (see below)
- Minimize disturbance to, or movement of soil and vegetation
- Prevent soil damage and erosion
- Ensure imported soil, seeds and other materials are safe and free of AIS (source from a reputable supplier, request information on the soil's origin and certification of AIS-free status if possible)
- Prevent AIS establishment on exposed stored soil (do not store bare soil near known sources of AIS, consider matting to cover exposed soil)
- Ensure infested material is disposed of safely
- Retain as much natural vegetation as possible
- Use native plants for reinstatement and landscaping
- Assess any non-native species for AIS.

6.4.8.1 Residual Impacts

The ZoI of the Project supports habitats and species typical of the region which are of very high to low biodiversity conservation importance. However, the habitats and species of high/medium conservation value are either unlikely to be affected by the Project, or the magnitude of the impacts is likely to be minor or negligible.

Without mitigation the Project would have a number of minor adverse impacts on the biodiversity. These impacts will be significantly reduced through the responsible implementation of the mitigation measures.

In the long-term the overall impact on biodiversity is likely to be negligible.

Table below summarises the residual impacts of the Project on the key ecological features which occur within the ZoI.

Table 6.31: Summary of the residual impacts

Key Ecological Features	Potential Impacts (construction)	Sensitivity (Conservation Importance)	Magnitude of Impact	Impact Significance	Mitigation	Residual Impacts
Nature conservation areas						
International designations (IBA)	Impacts very unlikely as the IBA is away from Project site	Very high	Negligible	Negligible	None required	Negligible
National and Local Designations	Impacts very unlikely	Medium and High	Negligible	Negligible	None required	Negligible
Habitats						
Natural and modified habitats	Habitat loss for construction of channels. Increased dust.	Low and Negligible	Minor	Negligible	Best practice measures to minimise habitat loss and degradation	Negligible
Flora						

Key Ecological Features	Potential Impacts (construction)	Sensitivity (Conservation Importance)	Magnitude of Impact	Impact Significance	Mitigation	Residual Impacts
Nationally important plant species	Impacts on Red Book Species	High	Negligible	Negligible	Avoid removal of trees. Pollution prevention and best practice measures to minimise habitat loss and degradation	Negligible
Non-notable plant species	Pollution resulting from the spillage of chemicals.	Low	Minor	Negligible	Pollution prevention and best practice measures	Negligible
Fauna						
Threatened bird species (IUCN Red List)	Loss of small areas of suitable habitat, noise and disturbance.	Very high	Minor adverse	Minor	Avoidance or minimisation of habitat loss and degradation. Best practice measures during construction and operation to reduce noise. Pre-construction checks for breeding birds	Negligible
Threatened bird species (IUCN Red List)	Loss of small areas of suitable habitat, noise and disturbance.	Very high	Minor adverse	Minor	Avoidance or minimisation of habitat loss and degradation. Best practice measures during construction and operation to reduce noise. Pre-construction checks for breeding birds	Negligible
Non-notable mammals, reptiles, amphibians, bird species	Noise and disturbance.	Low	Minor	Insignificant	Best practice measures for noise and disturbance.	Insignificant

Source: Mott MacDonald

6.4.9 Proposed Monitoring and Reporting

Monitoring of ecological mitigation will be conducted for the duration of the construction and operation phases. These requirements, along with associated responsibilities and reporting requirements will be detailed in the CEMP and Operation EMP. The Environmental Manager will ensure the measures included in this report are implemented during the construction and operation of the Project. Specialist advice from a qualified ecologist will be sought as required. The environmental (including ecological) reporting responsibilities during construction will be described in the CEMP.

6.5 Material and Waste Management

This chapter outlines the proposed approach for the management of the key materials to be used and waste predicted to arise during the construction, operation and decommissioning phases of the Project.

Material and waste management is a key aspect to be assessed by the Project to achieve minimisation of agrochemicals consumption, maximise opportunities for waste reuse and recycling and ensure that any final treatment or disposal of wastes generated by the Project is conducted in an environmentally sound manner, particularly for hazardous wastes.

6.5.1 Methodology and Assessment Criteria

6.5.1.1 Overview

The assessment of impacts from material handling and waste generation has been conducted on the basis of a desk-based review of Project information provided by the Project parties, in addition to observations of current material handling and waste management practices and infrastructure in place in the Project area following the site visit.

6.5.1.2 Applicable Standards

EBRD Performance Requirements

EBRD PR3 on Pollution Prevention and Abatement requires that generation of hazardous and non-hazardous waste materials is avoided or minimised, and that their harmfulness is reduced as far as.

The EBRD are committed to promoting EU environmental requirements. The main European measure in relation to waste is Directive 2008/98/EC. Under the Directive, EU Member States must work towards encouraging the prevention or reduction of waste and its harmfulness, through the development of clean technologies, product improvements and disposal techniques. The recovery of waste materials is also encouraged, as is the prohibition of uncontrolled dumping.

International Finance Corporation

PS3 on Pollution Prevention and Abatement requires reference to be made to relevant EHS Guidelines; these are technical reference documents with general and industry-specific examples of GIIP. The IFC General EHS Guidelines and Environmental, Health, and Safety Guidelines for Annual Crop Production contain relevant information related to materials and waste management for the Project.

Industry-specific wastes should be reused or recycled. Where this is not possible, they should be disposed according to waste management recommendations in the IFC EHS Guidelines. The IFC General EHS Guidelines state that hazardous and non-hazardous wastes are stored and handled in a way consistent with good EHS practice for waste management.

These guidelines have been used to shape the waste management approach for the Project and assess the Project's ability to meet GIIP.

Waste Classification

In Uzbekistan, waste is classified into 4 categories as described below. Where appropriate the classification of the Project waste streams and materials have been identified within this report. Waste hazard classes include:

- Class I – Extremely hazardous waste
- Class II – Highly hazardous waste
- Class III – Moderately hazardous waste
- Class IV – Low-hazardous waste.

6.5.1.3 Scope

In terms of considering the consumption of agrochemicals and fuel (including receipt, handling and storage) and subsequent management and disposal of waste, the spatial scope of the Project encompasses the whole Project area including gins, agricultural chemicals storage facilities, vehicle depots, fields and canals.

The temporal scope covers the potential impacts related to the consumption of materials (including reception, handling and storage) and subsequent management and disposal of waste arising from the construction, operation and decommissioning phases of the Project.

6.5.1.4 Assessment of Impact Significance

An assessment of the significance of impacts with regards to the agrochemicals, oil products and waste generated by the Project has been made for the construction, operational and decommissioning phases. The significance of potential impacts is a function of the presence and sensitivity of receptors and the magnitude of the impact in terms of duration, spatial extent, reversibility and likelihood of occurrence.

The assessment follows the standard assessment structure outlined in Chapter 3.

6.5.2 Baseline Description

At present, FE “Indorama Agro” LLC and local farmers conduct operations in the Project area that use and generate various materials and hazardous substances) and wastes used and generated in the Project area that may cause adverse environmental impacts:

- Insecticides;
- Herbicides;
- Fungicides;
- Various kinds of fertilizers;
- Motor fuel (gasoline, diesel).

Description of pesticides properties is given in the Ground and Soil Conditions article (Section 6.2).

The Project is expected to adopt the following approach to waste management:

- Vegetative parts of plants not used for production of end product will be ploughed into field, for improvement of soil structure and composition;
- Offgrade cotton seeds will be sold to cotton oil producers;
- Cotton fibre wastes will be sold for utilization in production of cellulose;
- Domestic wastes will be transferred to licensed contractor for disposal at landfill;
- Hazardous wastes (oil, mercury lamps, waste pesticides and fertilizers) will be transferred to licensed contractor for neutralisation and final disposal at landfill;
- Metal scrap will be transferred for recycling.

The quantity of wastes from FE “Indorama Agro” LLC operations will be determined as part of the national OVOS procedure at further stage of design development, based on the Project design characteristics.

6.5.3 Assessment of Impacts

6.5.3.1 Overview

The principle potential impacts which can arise from the material handling and generation of waste from the Project are as follows:

- Contamination on the environment, particularly surface irrigation and drainage water, groundwater and the ground due to leakage and spillage of materials and wastes associated with poor handling and storage arrangements;
- Fugitive emissions, such as dust and vapour associated with handling and storage of some materials and waste streams;
- Occupational Health and Safety impacts;
- Fire and explosion hazards due to use of reactive, flammable and explosive materials;
- Visual impacts normally associated with poor storage of waste;
- Increased waste miles from transporting waste materials from the Project to their final disposal location.

Based on the handling and disposal requirements, materials and waste can be grouped into two categories - non-hazardous and hazardous.

Potential hazardous materials and wastes may include: pesticides, fertilizers, oils and solvents waste, contaminated packaging, cleaning materials, contaminated soils (potentially from leakage and spillage), used batteries, mercury lamps. Management of these hazardous substances, particularly handling and final treatment or disposal options will require close consideration.

The following sections discuss the potential environmental impact and the proposed handling / storage and disposal methods for each of substances that may arise during the three stages of the Project.

6.5.3.2 Construction

This section aims to characterise the raw materials to be consumed and the waste streams which can arise from construction activities associated with the development of the Project.

Material Use

Materials used during construction will principally comprise the items of equipment for the Project, as well as materials used for site preparation such as rods for piling and buildings, concrete for foundations and auxiliary structures, steel for buildings, materials for fitting out the interiors of buildings.

Waste Generation

The environmental impacts of wastes associated with the Project construction phase will be short-term and mostly reversible for aspects such as littering of the construction site and surrounding territory by packages and domestic wastes, pollution of soils by waste concrete, bricks and spills of oil products. These potential impacts during the construction phase will be effectively managed through detailed waste management plans to be elaborated in line with the framework waste management plan outlined in the ESMP. Specific details of such waste management plans will be prepared as part of design and construction documentation.

Table 6.32 summarises waste streams that are expected in relation to the Project construction, as well as their potential impacts, handling / storage arrangements, and the method of disposal for each waste stream.

Table 6.32: Construction wastes: Potential impact, proposed handling / storage and disposal method

Waste Type	Potential Impact	Handling / Storage Method	Disposal Method
Non-hazardous Construction Wastes			
Excavation spoil	Contamination of environments such as sedimentation in water canals. Fugitive dust emissions. Land take for disposal of spoil and excavation material	Temporary storage on the site for subsequent use on site, or removal. Excess waste will be disposed of in spoil disposal sites or used to level off the site.	Spoil disposal site. Collection by contractor.
Concrete waste	Fugitive dust emissions. Disposal to landfill where waste re-use or recovery is not feasible. Increased waste miles from transporting waste materials from the Project site	Suitable temporary storage in a waste management area. Using it in other work locations or returning unused raw materials to the vendor can minimise the volume of waste.	Waste concrete can be crushed and used as road material or fill, or can be buried at a local landfill site. Soils contaminated with raw materials can also be used as landfill cover. If surplus quantities for the above are present - collection and disposal by licensed contractor for recovery and reuse.
Concrete wash water	Contamination of receiving environments such as sedimentation of water canals	Wash water which cannot be immediately reused is to be stored in an open lined pit or open tanks so as to aid sedimentation or other on-site treatment as appropriate.	Concrete wash water to be reused on site wherever possible. On site, concrete batching should include wash water recirculation. Remaining wash water to be stored and allowed to evaporate. Any remaining wash water to be fully treated (fine solids removed by filtration or settlement and pH corrected to 6-9) before being discharged to surface water, subject to valid permit (but not to ground).
Cement	Contamination of receiving environments	Suitable temporary storage in a waste management area.	Cement slurry will be left to dry out. Collection by competent contractor for recovery and re-use.
Iron and steel scrap	Disposal at landfill where waste re-use or recovery is not feasible. Visual amenity impacts associated with poor storage of waste.	Suitable segregate storage on a temporary basis in a waste management area.	Collection by competent contractor for recycling. Scrap metal will be sold for recycling, as appropriate.

Waste Type	Potential Impact	Handling / Storage Method	Disposal Method
	Increased waste miles due to transporting waste materials from the Project site.		
Non-ferrous scrap	Disposal at landfill where waste re-use or recovery is not feasible. Visual amenity impacts associated with poor storage of waste. Increased waste miles due to transporting waste materials from the Project site	Suitable temporary storage in a waste management area.	Collection by competent contractor for recycling.
Bricks and tiles	Disposal at landfill where waste re-use or recovery is not feasible	Suitable temporary storage in a waste management area.	Re-use. Surplus material should be retained on site.
Packaging	Disposal at landfill where waste re-use or recovery is not feasible. Visual amenity impacts associated with poor storage of waste. Increased waste miles due to transporting waste materials from the Project site.	Suitable temporary storage in a waste management area.	Collection by a contractor for recycling.
Used pallets from transportation or storage	Disposal at landfill where waste re-use or recovery is not feasible. Increased waste miles due to transporting waste materials from the Project site.	Suitable temporary storage in a waste management area.	Collection by a contractor for recovery and re-use.
Glass	Disposal at landfill where waste re-use or recovery is not feasible. Increased waste miles due to transporting waste materials from the Project site.	Suitable temporary storage in a waste management area.	Collection by a contractor for recycling.
Paper and cardboard	Disposal at landfill where waste re-use or recovery is not feasible. Visual amenity impacts associated with poor storage of waste. Increased waste miles due to transporting waste materials from the Project site.	Suitable temporary storage in a waste management area.	Collection by a contractor for recycling.
Timber	Disposal at landfill where waste re-use or recovery is not feasible.	Suitable temporary storage in a waste management area.	Collection by a contractor for recycling if feasible. All waste timber generated on site will be sold if possible, if not recycled.
Other Non-Hazardous Wastes			
Domestic waste	Disposal at landfill where waste re-use or recovery is not feasible. Visual amenity impacts associated with poor storage of waste and odour of rotting wastes. Increased waste miles due to transporting waste materials from the Project site.	Suitable temporary storage in a waste management area.	Collection in covered containers and sent to licensed local disposal site.
Plastics	Disposal at landfill where waste re-use or recovery is not feasible. Visual amenity impacts associated with poor storage of waste. Increased waste miles due to transporting waste materials from the Project site.	Suitable temporary storage in a waste management area.	Collection by a contractor for recycling.
Drums, barrels and containers from non-hazardous materials	Disposal at landfill where waste re-use or recovery is not feasible. Visual amenity impacts associated with poor storage of waste. Increased waste miles due to transporting waste materials from the Project site.	Suitable temporary storage in a waste management area.	Drums, barrels are collected by a contractor for recycling.
Hazardous Wastes			
Oils and lubricants	Hazardous. Contamination of environments.	Collection and temporary storage on a bunded site, in segregated marked	Recovery and re-use options to be fully explored. Collection by a contractor.

Waste Type	Potential Impact	Handling / Storage Method	Disposal Method
	Disposal at landfill where waste re-use or recovery is not feasible	drums within a waste management area.	Where recovery and re-use is not feasible - transfer to a contractor.
Oil contaminated wiping cloths	Hazardous. Contamination of environments. Disposal at landfill where waste re-use or recovery is not feasible.	Suitable temporary storage in a waste management area.	Collection by competent contractor to be disposed of in a licensed facility.
Batteries	Hazardous. Contamination of environments. Disposal at landfill where waste re-use or recovery is not feasible.	Suitable temporary storage in a waste management area.	Recycling options to be fully explored. Collection and disposal or recycling by a contractor. Where recycling is not feasible then transfer to a licensed contractor.
Fluorescent tubes	Hazardous. Contamination of environments. Disposal at landfill where waste re-use or recovery is not feasible.	Suitable temporary storage in a waste management area.	Collection and disposal by a licenced contractor.
Mercury lamps	Hazardous. Contamination of environments.	Collion and temporary storage on a bunded site in dedicated container within a waste management area.	Transfer to a licensed mercury disposal facility.
Used solvents	Hazardous. Contamination of environments.	Collion and temporary storage on a bunded site in dedicated drums within a waste management area.	Reuse if possible or return to the supplier. Any remaining solvents will be incinerated.
Asbestos	Hazardous. Disposal at landfill.	Suitable temporary storage in a waste management area.	Transfer to a licensed landfill.
Tyres	Disposal at landfill where waste re-use or recovery is not feasible. Visual amenity impacts associated with poor storage of waste. Increased waste miles due to transporting waste materials from the Project site.	Suitable temporary storage in a waste management area.	Collected by a contractor for recycling or disposal.

Source: Mott MacDonald

6.5.3.3 Operation

Materials Use

Materials considered to be of a hazardous nature will require bespoke consideration, particularly for handling, storage, final treatment and disposal options. Some materials will have a known consumption and storage volume whereas the consumption and volume of other materials will be dependent on routine activities therefore it is difficult to give exact volumes for all materials.

The following set of tables presents the key materials required for the Project.

Table 6.33: Key hazardous materials used during the Operation Phase

Material	Storage
Pesticides	Dry storage
Fertilizers	Dry storage
Mineral oil	Stored in drums in a secure bunded storage building
Diesel and petrol	Stored in tanks at a bunded territory
Sulphuric acid	Stored in drums in a secure bunded storage building
Mercury lamps	Stored in a secure box in a storage building

Source: Mott MacDonald

Specific handling and storage conditions for each of the materials and chemicals used during operation of the Project are outlined in their specifications (GOST standard or safety data sheet). Those include required storage conditions, specific storage and handling methods, safety requirements and spills protection methods.

All material deliveries will be unloaded in impermeably paved areas. All materials will be stored in a weather protected building and the flooring will be bunded to contain any spillages and equipped with a drainage

system. Sorbents and equipment for spills response procedures will be provided inside. Storage buildings will be also equipped with appropriate fire and explosion detection and response equipment.

Working solutions of fertilizers and pesticides will be prepared in the application machinery tanks or at a dedicated site with impermeable paving and a drainage system. Considering that pesticide packages are small (100 to 550 grams) and that fertilizers and pesticides are supplied as dry solids, any significant leakage to the environment is unlikely.

Fuel unloading from road tankers, fuel storage and fuelling of farming machinery will be arranged at dedicated sites equipped in line with the applicable national standards, including provision of impermeable paving and drainage system connected to oil trap within the storm water runoff treatment system, as well as firefighting equipment.

Waste Generation

Waste streams that will arise from the Project operation will require adequate utilisation, handling, storage and disposal procedures to ensure adverse environmental impacts are kept to a minimum and to comply with national regulations and applicable international standards. Hazardous wastes generated through the operations are expected to include spent chemicals, waste oils, oily rugs, mercury lamps. Table 6.34 below presents the expected sources of materials and waste streams, the potential environmental impact along with the expected handling and disposal method.

FE “Indorama Agro” LLC will minimize the value of wastes to be disposed at the landfills through recycling, incineration or transferring to recycling contractors.

Table 6.34: Overview of the operational phase material and waste handling strategy

Material / Waste	Source	Potential environmental impact	Mitigation and disposal method
Materials / Waste associated with overall activity			
Office and domestic waste	All activities	• Potential contamination of environment. • Visual amenity impacts. • Use of finite landfill resource.	Centralized collection and segregate temporary storage in waste accumulation areas within the gins, vehicles depots, office building before transfer for re-use, recycling or disposal.
Paper and cardboard	From packaging and deliveries, etc.	• Potential contamination of receiving environment. • Visual amenity impacts.	Centralized collection and segregate temporary storage in the gins, vehicles depots, office building before transfer for re-use, recycling or disposal.
Plastic	From packaging and deliveries, etc.	• Potential contamination of receiving environment. • Visual amenity impacts.	Centralized collection and segregate temporary storage in the gins, vehicles depots, office building before transfer for re-use, recycling or disposal.
Glass	Maintenance, deliveries, workers facilities	• Potential contamination of receiving environment. • Recycling potential.	Centralized collection and segregate temporary storage in the gins, vehicles depots, office building before transfer for re-use or recycling.
Scrap metal	Repair and maintenance	• Potential contamination of receiving environment. • Visual amenity impacts. • Recycling potential.	Centralized collection and segregate temporary storage in the gins, vehicles depots, office building before transfer for re-use or recycling.
Pallets	From deliveries	• Potential contamination of receiving environment. • Visual amenity impacts.	Centralized collection and segregate temporary storage in the gins, vehicles depots before transfer for re-use or recycling.
Solvent wastes	Buildings maintenance	• Hazardous. • Potential contamination of receiving environment.	Centralized collection and segregate temporary storage in the gins, vehicles depots and other facilities before transfer for neutralization.
Waste Electronics and Electrical Equipment	Maintenance and replacement of electrical equipment	• Hazardous. • Recycling opportunities	Waste is to be segregated into nonferrous and ferrous metals and will be dispatched for reuse. Nonferrous metals can be recycled.
Waste associated with production			
Solutions of herbicides	Crop production	• Hazardous • Potential contamination of receiving environment	All excessive pesticides solutions should be collected and sold/donated to other farmers or transferred to the municipal wastewater

Material / Waste	Source	Potential environmental impact	Mitigation and disposal method
			treatment plant or to a licensed contractor for neutralization.
Solutions of fertilizers	Crop production	• Hazardous • Potential contamination of receiving environment	All excessive fertilizers solutions should be collected and sold/donated to other farmers. or transferred to the municipal wastewater treatment plant or to a licensed contractor for neutralization.
Sulphuric acid	Cotton seeds processing	• Hazardous • Potential contamination of receiving environment	Sulphuric acid residues should be diluted with water and transferred to local wastewater treatment plant or to a licensed contractor for neutralization.
Fluorescent tubes	Routine maintenance and housekeeping	• Hazardous • Fluorescent tubes contain mercury	Temporary storage in dedicated area with adequate facilities, for subsequent transfer to licensed disposal contractors.
Contaminated packaging	Primarily associated with chemicals deliveries	• Hazardous • Unknown contaminants and potential contamination of receiving environments	Initially to be placed in hazardous waste collection area at the waste storage and disposed at landfill.
Oil	Vehicle maintenance Storm water drainage system (oil traps)	• Hazardous • Potential contamination of receiving environment	Temporary storage in appropriate containers at the waste storage and transfer to licensed contractor for neutralization.
Sludge	Storm water drainage system	• Hazardous • Potential contamination of receiving environment	Temporary storage in appropriate containers at the waste storage and transfer to licensed contractor for neutralization.
Oily contaminated materials, such as oily rags	Routine maintenance and repair	• Hazardous • Potential contamination of receiving environment	Temporary storage in appropriate containers at the waste storage and transfer to licensed contractor for neutralization.
Empty chemical containers	Materials delivery	• Hazardous • Potential contamination of receiving environment	Re-use options to be fully explored. Collection by a competent contractor. Where re-use is not feasible then disposal in a licensed facility.
Waste collected as a result of spills, leakages and/or accidents	Routine maintenance and repair	• Hazardous • Potential contamination of receiving environment	Stored in appropriate containers and transferred to the waste storage area before being collected and disposed of by a licenced contractor.

Source: Mott MacDonald

Storage of Products

Project will produce a cotton fibre, cotton seeds, wheat corn, and mung bean. Raw cotton will be stored at the open space at the gin sites. Cotton seeds, wheat corn and mung beans will be stored at silos. There no risk of contamination of the environment in relation to the Project products storage.

6.5.3.4 Decommissioning Waste Streams

GIIP and national regulation of Uzbekistan provide the following design considerations for waste management during decommissioning:

- Consideration of the environmental impact from the eventual decommissioning of the production equipment at the design stage, thereby allowing for an easier, cleaner and cheaper decommissioning process;
- Adopting preventive techniques against the generation of large quantities of solid waste, including:
  - avoiding underground structures;
  - incorporating features that facilitate dismantling;
  - choosing surface finishes that are easily decontaminated;
  - designing flexible, self-contained units that enable phased closure;
  - keeping upper layer of soil removed during construction for decommissioning;
  - selling equipment, metal scrap, wooden and demolition waste for future reuse and recycling;

- using biodegradable and recyclable materials where possible;
- avoiding accumulation of huge amount of undisposed waste during lifetime of the Project.

FE “Indorama Agro” LLC will employ all these approaches where possible and will continuously review waste disposal practices to identify more environmentally acceptable routes. Prior to the eventual decommissioning of the Project, a Decommissioning Environmental Management Plan (**DEMP**) will be prepared detailing the best practice approach that will be adopted. The DEMP will include a section on waste management.

6.5.3.5 Impact Significance

provides a summary of the impact significance associated with material handling and waste management. Impacts evaluated as being ‘moderate’ or ‘major’ are significant effects. Impacts that are ‘minor’ or ‘negligible’ are not significant.

Table 6.35: Overview of the operational phase material and waste handling strategy

Activity	Potential Impact	Sensitivity	Magnitude	Impact
Construction				
Material handling. waste generation, handling and storage	Contamination of environments (particularly canals, groundwater and the ground) due to leakage and spillage of materials and wastes associated with poor handling and storage arrangements	Low	Moderate	Minor
	Fugitive emissions, such as dust, associated with the handling and storage of some materials and waste streams	Low	Moderate	Minor
	Visual amenity impacts associated with poor storage of waste	Low	Minor	Negligible
Choice of final waste disposal route	Increased waste miles from transporting waste materials from the Project site.	Low	Moderate	Minor
Operation				
Material handling, waste generation, handling and storage	Contamination of receiving environments due to leakage and spillage of materials and waste streams from operation of the Project	Low	Moderate	Minor
	Fugitive emissions associated with handling and storage of operational material and waste streams	Low	Moderate	Minor
Choice of final waste disposal route	The use of landfill, which is a finite resource	Low	Moderate	Minor
	Recycling and reuse of materials	Low	Minor	Negligible
	Increased waste miles from transporting waste materials from the Project site.	Low	Moderate	Minor

6.5.3.6 Cumulative Impacts

The construction and operation of the Project are unlikely to result in cumulative effects with the existing agricultural activities, as the Project will be implemented within a farmland area where sensitivity of environmental receptors is low. FE “Indorama Agro” LLC will explore opportunities to re-use and recycle waste arising from the Project where possible to minimise the amount of waste generated and improve soils quality.

6.5.4 Mitigation Measures

6.5.4.1 Materials Storage, Handling and Use

Material and waste handling and storage areas will be established within the Project sites during the construction phase and where appropriate these will be retained for the operational phase. These will be specifically designed giving due consideration to the following requirements and will be used before waste materials are transferred to the waste collection area:

- Separate storage areas for hazardous and non-hazardous materials and wastes;
- Separate containers for each waste stream to allow segregation in order to maximise re-use and recycling opportunities;

- All containers to be suitably covered (to avoid dispersion of light materials by wind or ingress of rain water);
- Liquid materials / wastes / oil / chemicals to be stored in tanks or drums located in bunded areas which can hold 110% of the total storage volume, and in compliance with national requirements;
- Spill kits to be available at all times;
- Located away from existing sensitive receptors such as undisturbed areas, populated areas;
- Not at risk from theft or vandalism;
- Easy a safe access;
- Well ventilated;
- Unlikely to be damaged;
- Appropriate Personal Protective Equipment (**PPE**) immediately available;
- Spill Control, Prevention and Response plan and an Emergency Preparedness and Response Plan.

The ESMP includes reference to the control measures in order to minimise the likelihood of incidents associated with materials storage, handling and use. These include the following:

- Identification of the necessary PPE requirements;
- Identification of the necessary bunding and spill kit requirements;
- Training requirements (as necessary) with respect to materials handling procedures;
- The correct procedure for reporting any environmental incidents related to spills / leakages and actions in case of spills / leakages;
- Inventory of hazardous materials and respective procedures / controls;
- All hazardous substances used by the Project will be covered by a Material Safety Data Sheet (**MSDS**).

6.5.4.2 Construction and Operational Waste Management Plans

For all construction activities associated with the Project, a waste management plan will be produced as part of the CEMP prepared by the construction contractor. A framework for the waste management plan is provided in the ESMP (Volume IV) of this ESIA. The final waste management plan will identify likely wastes, appropriate handling, reuse and recycling opportunities and, as a last resort, landfilling methods. The waste management plan will be prepared in compliance with the national and local regulations.

A detailed waste management procedure for the Project operational phase, to be developed using the above framework, will provide a fundamental tool to ensure that waste management best practice is always applied. The waste management procedure will provide the following:

- Highlight relevant legislation;
- A Site Waste Management Plan (**SWMP**) which will contain:
  - Map showing each temporary waste storage location for each Project site
  - Description of each waste generated by operation of the Project, its classification, appropriate handling methods, correct approach for temporary storage and correct route for removal/disposal off site
  - Waste generation volume records for each waste stream. This should include the proportion of each waste stream going for reuse, recycling or disposal. Any unusual waste volumes will be subject to closer examination
  - Any waste monitoring as deemed to be necessary
  - Audit schedule with details of waste management audits frequency and responsible parties
  - A section related to continuous improvement and corrective actions where audit findings can be recorded and incorporated into the waste management procedure. This will also highlight any new and feasible reuse or recycling opportunities which may arise over time

- Correct procedure for reporting any environmental incidents related to waste
- Specific regulatory reporting requirements (statistical forms and waste generation reports)
- Specific trainings and protective equipment for workers contacted with asbestos containing materials.

6.5.5 Proposed Monitoring

Materials and waste management monitoring for the Project construction will be undertaken by the Contractor. Materials and waste management monitoring for the Project operation phase will be undertaken by FE "Indorama Agro" LLC with reference of the process performance and waste volumes to be accurately estimated at the design stage, subject to approval by competent authorities.

Further monitoring measures are provided in the ESMP (Volume IV) and these should be integrated into the Project Environmental Management System which will be implemented by FE "Indorama Agro" LLC at a later stage. The monitoring data will be analysed and reviewed at regular intervals against the operating standards and permits so that any necessary corrective actions can be identified.

6.5.6 Residual Impacts

The mitigation measures identified above will ensure that the vast majority of materials used and waste generated by the Project will be managed in compliance with environmental best practice and the risk to the environment is significantly reduced. The resultant impacts following application of the mitigation measures are presented in Table 6.36. All residual impacts are described as not significant.

Table 6.36: Summary of residual impacts after mitigation

Activity	Potential impact	Sensitivity	Magnitude	Impact	Mitigation	Residual Impact
Construction						
Waste generation, and storage	Contamination of environments (particularly surface watercourses, groundwater and the ground) due to leakage and spillage of wastes associated with poor waste handling and storage arrangements	Low	Moderate	Minor	• Develop a waste management procedure as part of the ESMP • Identify a suitable temporary storage location for each waste stream • Onsite and offsite waste storage facilities will be provided including: – Separate storage areas for hazardous and non-hazardous materials / wastes; – Separate containers for each waste stream to allow segregation and maximise re-use and recycling opportunities; – All containers to have a suitable cover; – Liquid materials / wastes / oil / chemicals to be stored in tanks or drums located in bunded areas which can hold 110% of the total storage volume. • Spill kits to be available at all times	Negligible
	Fugitive emissions, such as dust associated with handling and storage of some materials / waste streams	Low	Moderate	Minor	• Cover all containers used for temporary storage	Negligible

Activity	Potential impact	Sensitivity	Magnitude	Impact	Mitigation	Residual Impact
	Visual amenity impacts associated with poor storage of waste	Low	Minor	Negligible	• Develop a waste management procedure • All waste storage vessels to be covered at all times	Negligible
Choice of final waste disposal route	The use of landfill, which is a finite resource should be final recourse	Low	Moderate	Minor	• Characterise each waste type as either hazardous or non-hazardous and determine the hazard class and applicable requirements • Seek to minimise waste generation in the first instance • Where waste streams are unavoidable, identify potential re-use and recycling opportunities according to current best practice and local opportunities	Negligible
	Increased waste miles due to transporting waste materials from the Project site.	Low	Moderate	Minor	• Identify waste management facilities in close proximity to the Project • Review on an on-going basis the locally available re-use / recycling facilities to ensure they can accept the waste streams.	Negligible
Operation						
Material use / waste generation and storage	Contamination of receiving environments due to leakage and spillage of materials / waste streams from the operation	Low	Moderate	Minor	• Develop a materials / waste management procedure • Identify a suitable temporary storage location for each material / waste stream • Both the onsite and offsite material / waste storage facilities will be designed to include the following: – Separate storage areas for hazardous and non-hazardous materials / wastes organised in appropriate way; – Separate containers for each waste stream to allow segregation in order to maximise re-use and recycling opportunities; – All containers to have a suitable cover; – Liquid materials /wastes/oil/chemicals to be stored in tanks or drums located in bunded areas which can hold 110% of the total storage volume. • Spill kits to be available at all times	Negligible
	Fugitive emissions associated with handling and storage of operational materials / waste streams	Low	Moderate	Minor	• Cover all containers used for temporary storage	Negligible
Choice of final waste disposal route	The use of landfill, which is a finite resource should be final recourse	Low	Minor	Minor	• Characterise each waste stream as either hazardous or non-hazardous and	Negligible

Activity	Potential impact	Sensitivity	Magnitude	Impact	Mitigation	Residual Impact
					determine the waste hazard class • Seek to minimise waste generation in the first instance • Where waste streams are unavoidable, identify potential re-use and recycling opportunities according to current best practice	
	Increased waste miles due to transporting waste materials from the Project site.	Low	Moderate	Minor	• Identify waste management facilities in close proximity to the Project • Review on an on-going basis the locally available re-use/recycling facilities to ensure they can accept the waste streams.	Negligible
Decommissioning – A future DEMP will be prepared						
Waste generation and storage	Contamination of receiving environments (particularly surface watercourses, groundwater and the ground) due to leakage and spillage of wastes associated with poor waste handling and storage arrangements	Low	Moderate	Minor	• Develop a decommissioning waste management procedure as part of the ESMP • Identify a suitable temporary storage location for each waste stream • Onsite and offsite waste storage facilities will be designed to include the following: – Separate storage areas for hazardous and non-hazardous wastes; – Separate containers for each waste stream to allow segregation and maximise re-use and recycling opportunities' – All containers to have a suitable cover; – Liquid wastes/oil/chemicals to be stored in tanks or drums located in bunded areas which can hold 110% of the total storage volume. • Spill kits to be available at all times	Negligible
	Fugitive emissions, such as dust, associated with handling and storage of some waste streams	Low	Moderate	Minor	• Cover all containers used for temporary storage of waste	Negligible
	Visual amenity impacts associated with poor storage of waste	Low	Minor	Insignificant	• Develop a waste management procedure • All waste storage vessels to be covered at all times	Negligible
Choice of final waste disposal route	The use of landfill, which is a finite resource should be final recourse	Low	Moderate	Minor	• Characterise each waste stream as either hazardous or non-hazardous • Seek to minimise waste generation in the first instance • Where waste streams are unavoidable, identify potential re-use and recycling opportunities	Negligible

Activity	Potential impact	Sensitivity	Magnitude	Impact	Mitigation	Residual Impact
					according to current best practice	
	Increased waste miles due to transporting waste materials from the Project site.	Low	Moderate	Minor	• Identify waste management facilities in close proximity to the Project • Review on an on-going basis the locally available re-use/recycling facilities to ensure they can accept the waste streams.	Negligible

6.6 Traffic and Transport

6.6.1 Introduction

This Chapter considers the potential traffic and transportation impacts associated with the construction, operation and decommissioning of the Project and associated projects.

6.6.2 Methodology and Assessment Criteria

6.6.2.1 Applicable Requirements

The principles of the traffic and transport assessment have been developed in line with IFC PS1 (Assessment and Management of Environmental and Social Risks and Impacts) and PS4 (Community Health, Safety and Security), and with EBRD PR1 (Environmental and Social Appraisal and Management) and PR4 (Community Health, Safety and Security).

The assessment has been undertaken through a desk-top study and a traffic survey. The methodology for the assessment is summarised as follows:

- Baseline description – establishing existing traffic and transport routes which lead to the existing agricultural area based on site visits observations
- Traffic survey – transportation of goods to/from the Project and associated projects and agricultural vehicles movements will create an increased number of additional movements and therefore a quantitative survey of the existing traffic loads on the key traffic route to the site to be undertaken to inform the baseline description.

6.6.3 Traffic Survey

A traffic survey was undertaken in August 2019 on driveways near gins and residential complexes. The survey included traffic counting of the following two types of vehicles:

- Light Vehicles – Cars, motorcycles, taxis and small vans
- Heavy Vehicles – All lorries and other large vehicles, including buses.

The survey points were selected taking into consideration the safety of surveyors and remoteness from the sites. The survey was undertaken manually during working hours and each surveyor focused on the dedicated lane and direction of travel along the road.

Surveys were undertaken for peak traffic periods in the morning (07:00 – 08:30) and in the afternoon (16:00 – 17:30) as well as at noon (12:00 – 13:30), all at 15-minute intervals.

Table 6.37: Traffic count recordings

Place	Light Vehicles per 1 min (average value)	Heavy Vehicles per 1 min (average value)
Kashkadarya Gin	10	5
Syrdarya Gin	12	6
Karshi Residential Complex	60	12
Gulistan Residential Complex	120	22

Source: Mott MacDonald

City roads were generally busy with passenger cars, there was no congestion. Heavy vehicles are represented mostly by passenger buses. Rural roads were busy with passenger cars, donkey riders and small buses.

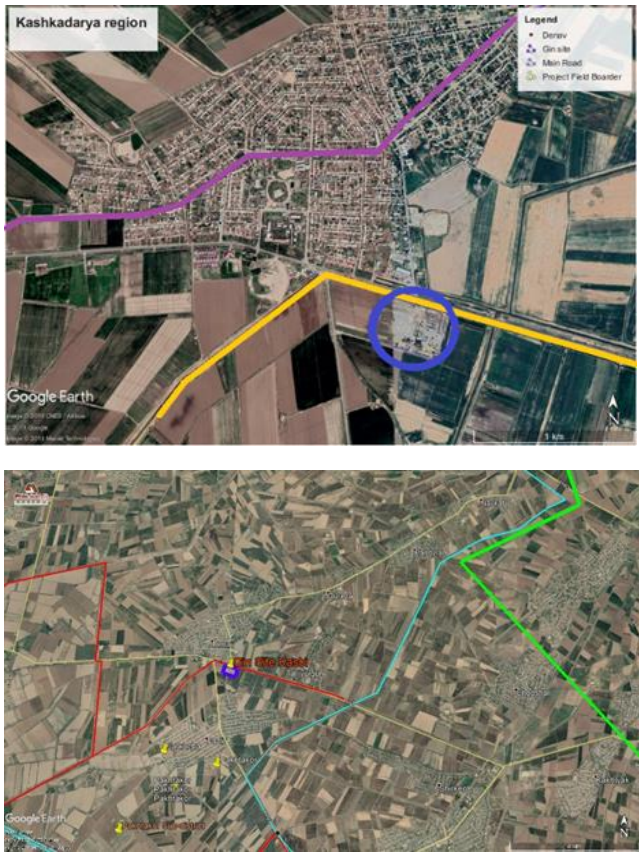
6.6.4 Assessment of Project Impacts

Possible impacts associated with the additional traffic generated by the Project have been identified and their significance assessed. The significance criteria have been adopted for the prediction of impacts as defined in Chapter 3.

It was considered at the scoping stage that the potential impacts on the sensitive receptors around the construction sites such as gins under the Project would be insignificant by the following reasons:

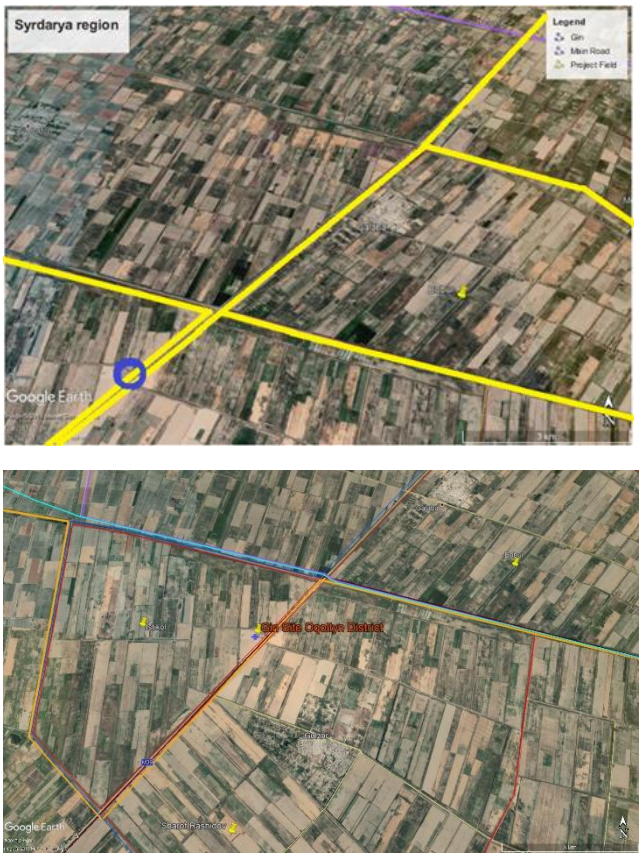
- All these sites are located near the secondary roads within a wide agricultural area with very low traffic (used mostly by local farmers to get fields or another settlement by car or riding a donkey (0-15 movements per minute)
- The construction of ginning facilities and vehicles depots will require a limited volume of construction materials and equipment to be delivered for construction
- Movements of agricultural vehicles and trucks by these roads will be limited only by vehicle fleet of FE “Indorama Agro” LLC
- Fruits, melons and watermelons produced by individual farmers delivered to the local markets by small cars
- Delivery of cotton to/from gin sites will not affect traffic on roads because only 4 cotton trucks will be supplied for each project area.

Map 6.7: Kasbi Gin location



Source: FE “Indorama Agro” LLC

Map 6.8: Oqoltyn Gin location



Source: FE “Indorama Agro” LLC

Considering reasons above, traffic and transportation impacts of the Project are to be negligible and are not future discussed in this ESIA.

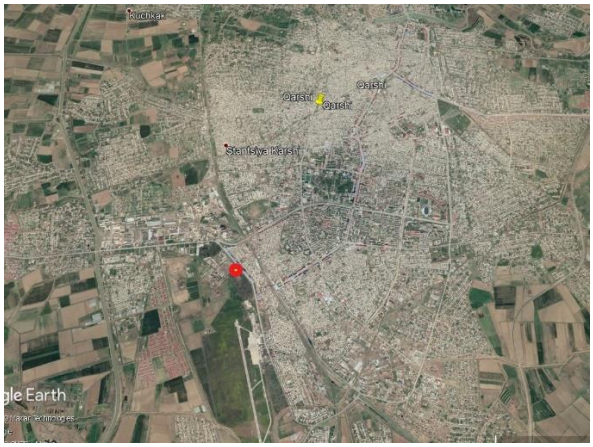
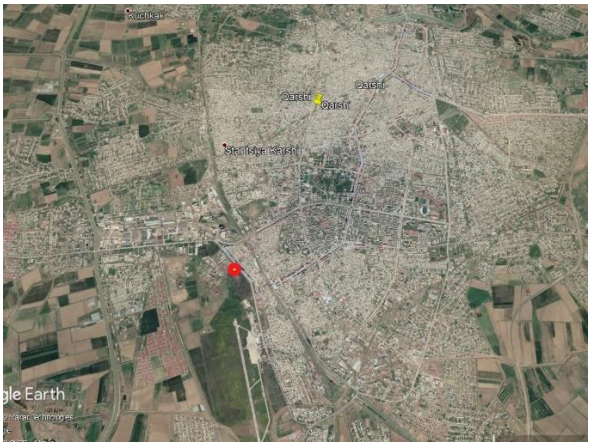
Impact of dust and exhaust gas emissions during construction and operational phase of the Project are considered to be negligible to low magnitude and described in Sub-section 6.1.4.

6.6.5 Assessment of Associated Projects Impacts

The Company plans new-build construction of two low-rise residential complexes for the employees recruited from other regions of Uzbekistan and from abroad. The construction of these complexes is expected within the boundaries of the cities of Karshi and the city of Gulistan. These residential complexes are designed for 300 residents each. The location of the residential complexes is shown in the figure below.

Map 6.9: Location of the residential complexes

Karshi **Gulistan**

Source: FE “Indorama Agro” LLC

Additional daily traffic at the construction stage will not represent a major increase in traffic volumes on the connection roads because of small volume of construction material required. The magnitude of additional movements is considered as minor.

The sensitivity of the road network to accommodate the increase in traffic flows is considered low, therefore the impact of construction movements on the capacity of the local road network is of minor adverse significance.

During the operational period the impact to be negligible due to the number of residents.

6.6.6 Mitigation Measures

It is assumed that the mitigation measures proposed for construction will also be applied during the decommissioning phase. However, it is expected that mitigation based on future knowledge and best practice will be recommended as part of any future detailed decommissioning plan.

There are no significant impacts identified associated with the construction and operational phases, however good practice measures and recommended measures to reduce non-significant impacts are outlined in Table 6.38.

Table 6.38: Mitigation and enhancement measures

Impact Theme	Mitigation and Enhancement Measures
Delays to road users as a result of number of construction vehicles and trucks	Delivery of construction materials should be conducted out of peak hours. Prohibition of vehicles parking along roads.
Reduced safety of vulnerable road users on the local roads and of residents affected by construction	Measures to reduce the risk to vulnerable road users and occupants of residential properties in the vicinity of access routes will be identified as part of the detailed CTMP.

The Project should develop a Traffic Management Plan for the operation phase to reduce safety risks for vulnerable road users on the local roads and directly affected communities during operation associated with the Project machinery movements.

6.6.7 Residual Impact

No residual impacts are expected.

6.6.8 Monitoring

Standard monitoring on road incidents in line with national requirements. Special monitoring is not required.

6.7 Noise and Vibration

Noise and vibration impact during the Project implementation and operation activities will originate from various sources including running construction and agricultural machines, gins for separation of cotton fibres, seeds and waste, as well as cotton seeds storage. Given the remote location of the planned gin site in Syrdarya Region in relation to sensitive receptors like residential communities, its potential noise impact will be scoped out of further analysis.

6.7.1 Methodology and Assessment Criteria

6.7.1.1 Significance Criteria

The significance of effects due to noise is a function of the magnitude of the impact and the sensitivity of the receptor. Chapter 3 presents the significance criteria to be used in this assessment.

The methodologies and scales used to assess the receptor sensitivity and magnitude of the key noise impacts expected during construction and operation are set out below.

6.7.1.2 Sensitivity of Receptors

Sensitivity criteria for the assessment of noise impacts affecting sensitive receptors are assigned in Table 6.39.

Table 6.39: Sensitivity of receptors

Sensitivity	Type of receptor
High	Residential area, hospitals, schools, colleges or universities, places of worship, designated environmental areas, nature areas, high value amenity areas, cemeteries.
Medium	Offices, recreational areas, agricultural land.
Low	Public open spaces, industrial areas, car parks.
Negligible	Derelict land.

Source: Mott MacDonald

The main sensitive receptors identified within the Project area are grouped into village settlements, and a prison. All receptors within these areas are considered to have high sensitivity for the purposes of this assessment.

6.7.1.3 Magnitude of Impacts

Construction Phase Impacts

Construction work is temporary in nature and generally includes both stationary and moving sources of noise. Stationary sources include construction equipment positioned at a given location on a temporary basis while moving sources normally comprise mobile construction equipment and vehicles.

The assessment of construction noise involves the identification of activities that have a potential to generate high levels of noise. It is necessary to consider the contribution of the noise sources involved in particular construction activities in order to predict the likely impact. Details of the construction activities used to predict the noise impacts (e.g. items of plant to be used during each stage, the noise emission and utilisation of items, duration of work) are not fully defined at this stage. However, the noise levels have been assessed based on the use of generic items of construction plant expected to be used for a project of this nature in order to provide an indication of the likely impacts.

Noise levels for construction and field vehicles are adopted in line with the “Construction Noise Handbook. Construction Equipment Noise Levels and Ranges. Equipment Type Inventory and Related Emission Levels” published by the U.S. Department of Transportation, Federal Highway Administration, Office of Natural and Human Environment in 2006 on the basis of actual measurements of effective noise levels of different vehicles.

Construction noise levels are deemed to be significant if the ambient noise levels during construction (pre-construction ambient plus construction noise) exceed the pre-construction ambient noise by 5dB or more, subject to a lower threshold value of 65 Leq dB(A) due to construction noise alone, assuming all works can be undertaken during the daytime. The scales for magnitude of construction noise impacts are summarised in Table 6.40.

Table 6.40: Magnitude criteria for construction noise impacts

Predicted receptor noise level due to construction noise alone L_{eq} dB(A)	Increase in ambient noise levels due to the construction noise impact (dB)	Magnitude of Impact
Below 65 dB(A)	Less than 5 dB	Negligible
	5 dB or more	Minor
65 dB(A) or above	Less than 5 dB	Moderate
	5 dB or more	Major

Source: Mott MacDonald

Operational Phase Impacts

Criteria for assessing the magnitude of operational noise impacts are presented in Table 6.41 and have been developed based on the Sanitary Norms, IFC / WB Noise Level Guidelines and WHO Guidelines.

Table 6.41: Magnitude criteria for operational noise impacts

Criteria	Definition	Magnitude of Impact
Daytime: 55 dB $L_{Aeq,1h}$ Night-time: 45 dB $L_{Aeq,1h}$	Operational noise level at the receptor does not exceed the criterion	Negligible
	Operational noise level at the receptors exceeds the criterion by less than 3 dB and ambient level increased by less than 3 dB	Minor
	Operational noise level at the receptor exceeds the criterion by less than 3 dB and ambient level increased by 3 dB or more	Moderate
	Operational noise level at the receptor exceeds the criterion by 3 dB or more and ambient level increased by 3 dB or more	Major

Source: Mott MacDonald

Sound Attenuation – Inverse Square Law

The Inverse Square Law can be used to provide an estimate of sound pressure level at the sensitive receptors for projects with low and temporary noise impact. In terms of propagation and attenuation of sound, the Inverse Square Law is a principle in physics whereby a point source emits a sound wave uniformly in all directions (essentially spherically), where the intensity of the sound wave energy at any given point away from the source is diminished as a function of the total surface area of the sphere coincident with that point.

To determine the sound attenuation over a distance using the Inverse Square Law, an idealisation is applied in which there are no reflective surfaces or barriers between the source and the location at which the sound level is being determined.

According to the Inverse Square Law, it can be shown that for each doubling of distance from a point source, the sound pressure level decreases by approximately 6 dB.

The formula to calculate sound attenuation over distance from a point source is:

$$Lp(R2) = Lp(R1) - 20 \cdot Log10(R2/R1)$$

Where:
Lp(R1) = Sound pressure level at the initial location
Lp(R2) = Sound pressure level at the new location
R1 = Distance from the noise source to the initial location
R2 = Distance from the noise source to the new location.

6.7.2 Assessment of Impacts

The impact assessment below covers the following activities:

- Construction of gin near Denov community in Kashkadarya Region including transportation of building materials and structural elements;
- Fields levelling to ensure better irrigation for cotton growing, reconstruction and excavation of ditches and other watering and drainage infrastructure for cotton fields, as well as landscaping activities using heavy machinery;
- Agricultural machinery operation in fields;
- Ginning machines operation at the gin sites.

6.7.2.1 Land Development, Preparation and Construction Phase Impacts

Construction of Gin Near Denov Community

Temporary noise and vibration impact during the gin construction is expected to arise due to:

- Site clearance and earth works mainly excavation and piling;
- Delivery and movement of materials;
- Construction of infrastructure and buildings, and installation of equipment.

Construction plant that is assumed to be required for general work is listed in Table 6.42. Reference noise levels and result of sound attenuation are given to indicate the overall noise emissions, and noise level near of the closest private house in Denov community which is the nearest sensitive receptor to the gin.

Table 6.42: Assumed inventory of construction plant for general works, dB(A)

Plant	Construction Noise Handbook (15 m from the source)[70]	Distance to Denov, m	Result of sound attenuation	National standard[71] SanPiN 0267-09	IFC EHS Guidelines[72]
Flatbed trailer	74	116	51	55 - 7am – 11pm 45 - 11pm – 7am	55 - 7am – 11pm 45 - 11pm – 7am
Excavator	81		58		
Compactor (ground)	83		60		
Compressor (air)	78		55		
Concrete mixer truck	79		56		
Crane	81		58		
Generator	81		58		
Grader	85		62		
Paver	77		54		
Pneumatic tools	85		62		
Vibrating hopper	87		64		

Source: Mott MacDonald

The following assumptions have been made for the assessment:

- Assumed noise levels from running equipment are based on actual measured values published by the US Department for Transportation
- Knowing that the nearest residential house is located 116 m from the site boundary and no significant terrain variations are present on the way, dispersion modelling was skipped, and tentative noise levels were assessed using the Inverse Square Law (refer to Sub-section 6.7.2.1)
- All plant will not run simultaneously and continuously
- Ginning will be conducted only for a short period during the cotton-picking season
- Background noise levels were not measured, due to the obvious absence of any other significant sources of noise in the area.

Fields Levelling, Reconstruction and Construction of Irrigation and Drainage Systems

In most cases, noise from fields levelling, canals cleaning and reconstruction is not expected to cause any significant impact on local communities, as the activities will be conducted in or along the fields.

Considering that few fields adjoin village territories and that noise sources (machinery) will run at a variable distance from boundary of residential areas, significance of the noise impact can be assessed as moderate, even though the expected increase of noise level during the works may rise above 60 dB(A) at the village boundary (Table 6.43).

Table 6.43: Assumed inventory of construction plant for fields redevelopment, dB(A)

Plant	Construction Noise Handbook (15 m from the source)[73]	National standard[74] SanPiN No. 0267-09	IFC EHS Guidelines[75]
Excavator	81	55 - 7am – 11pm	55 - 7am – 11pm

[70] U.S. Department of Transportation, Federal Highway Administration, Office of Natural and Human Environment: Construction Noise Handbook. Construction Equipment Noise Levels and Ranges. Equipment Type Inventory and Related Emission Levels. 2006.
[71] SanPiN 0267-09 “Sanitary norms and rules to provide to arrange applicable levels of noise in living and public houses at the residential territories”.
[72] IFC EHS General Guidelines: Environmental – Noise Management.
[73] U.S. Department of Transportation, Federal Highway Administration, Office of Natural and Human Environment: Construction Noise Handbook. Construction Equipment Noise Levels and Ranges. Equipment Type Inventory and Related Emission Levels. 2006.
[74] SanPiN 0267-09 “Sanitary norms and rules to provide to arrange applicable levels of noise in living and public houses at the residential territories”.
[75] IFC EHS General Guidelines: Environmental – Noise Management.

Plant	Construction Noise Handbook (15 m from the source)[73]	National standard[74] SanPiN No. 0267-09	IFC EHS Guidelines[75]
Concrete mixer truck	79	45 - 11pm – 7am	45 - 11pm – 7am
Grader	85		

Source: Mott MacDonald

Results of the assessment show that the predicted noise impact due to construction noise from general plant and earth works is expected to exceed the daytime threshold level of 60 dB(A) at the receptor and will result in ambient noise levels increasing by 5dB or more. In all cases, the magnitude of impact during the daytime is assessed as moderate; therefore, significance of the impact is assessed to be major.

6.7.2.2 Operation Phase Impacts

Agricultural Works

The main sources of noise during agricultural works will be running machinery, e.g. levellers, combine harvesters and other machines used in the fields. Considering that activities related to fields preparation for seeding, application of fertilizers and pesticides, and harvesting will cause impact similar to that of the initial fields' preparation early in the Project, the impacts of agricultural works have not been assessed separately).

Ginning Machines

Comprehensive studies of cotton production noise published by the Central Institute of Agricultural Engineering, India in 2007[76] indicate that noise levels from ginning machines and other equipment at gin sites may be as high as 100 dB(A), and medium level of noise at the shop entrance is about 65 dB(A). Therefore, after the natural attenuation, noise level at the nearest sensitive receptors will be 43 dB(A), i.e. significantly lower than the threshold level of 55 dB(A) at daytime and 45 dB(A) at night. Furthermore, ginning machines operation will follow an intermittent and seasonal pattern.

Therefore, magnitude of the operational impact on sensitive receptors from running agricultural machinery and ginning machines can be assessed as moderate negative, and the impact significance is expected to be moderate.

[76] Institute of Agricultural Engineering, India in 2007: Development in Agricultural and Industrial Ergonomics (Volume – I), 2007.

Map 6.10: Nearest sensitive receptor location, gin plant in Kasbi district

Source: FE “Indorama Agro” LLC

6.7.2.3 Closure and Decommissioning Phase Impacts

The main sources of noise impact during demolition and dismantling, reclamation of fields and canals will include levellers, excavators and other machinery used for the activities. Considering that impact of such activities will be similar to that of the initial fields’ preparation early in the Project, the impacts of agricultural works have not been assessed separately.

6.7.2.4 Occupational Health Impacts

Personnel health and safety standards in Uzbekistan are set in GOST 12.1.003-83 “Occupational safety standards system. Noise. General safety requirements”. This regulation presents a table of noise levels for a variety of internal and external applications, the most relevant of which are summarised below in Table 6.44. In addition, the IFC sets noise limits for various working environments.

Table 6.44: Workplace noise limits

Type of Work, workplace	GOST 12.1.003-83	IFC General EHS Guidelines
Performing all types of work on the permanent workplaces in industrial premises and in the enterprises operated from March 12, 1985	80 dB(A)	-
Heavy Industry (no demand for oral communication)	-	85 Equivalent level Laeq,8h

Type of Work, workplace	GOST 12.1.003-83	IFC General EHS Guidelines
Light industry (decreasing demand for oral communication)	-	50-65Equivalent level Laeq,8h

Source: Mott MacDonald

Considering the results of ginning machines noise studies[77] it is expected that the Project will not comply with GOST 12.1.003-83 and the IFC Guidelines. In all cases, the magnitude of occupational health impact is assessed as major and the impact significance is expected to be major.

6.7.2.5 Road Traffic

Additional vehicle movements during the construction and operational phases of the Project may generate noise impacts from traffic on local roads and site tracks. The total daily number of vehicle trips is not known at this stage but is not expected to increase traffic flows by 25% which corresponds to a 1dB increase in road traffic noise. Therefore, the magnitude of the noise impact due to construction and operational phase traffic is qualitatively assessed as negligible; therefore, the impact significance is assessed to be negligible.

6.7.2.6 Vibration

Ground-borne vibration from construction activities or operational sources has a potential to affect the occupants of buildings or the structure itself. This is mainly associated with construction activities such as percussive piling, or vibratory equipment used in demolition. This can be a matter of concern where this type of work is undertaken in close proximity to buildings. However, relatively high levels of vibration are required before the onset of cosmetic or structural damage, and this tends to develop only in combination with other issues such as differential settlement of the building.

Given the proximity of the development site to sensitive receptors offsite (the closest located around 116 m to any proposed infrastructure), effects of vibration during construction and operation are qualitatively assessed as negligible.

6.7.3 Mitigation and Enhancement Measures

6.7.3.1 Land Development, Preparation and Construction Phase

Adverse impact of noise arising from construction works on sensitive receptors and occupational health and safety should be controlled against the noise limits set forth in the IFC General EHS Guidelines.

Activities associated with site excavation and foundation works have a potential to generate the greatest construction phase noise impacts. Specific mitigation measures during the construction works are as follows:

- All noisy works will be conducted during the daytime;
- Unnecessary revving of engines will be avoided, and equipment will be shut down when not in use;
- Internal haul routes will be well maintained;
- Plant and vehicles will be started up sequentially rather than all together;
- Effective exhaust silencing systems or acoustic engine covers will be used as appropriate;
- Machines will always be operated in accordance with manufacturers' instructions;
- Care will be taken to keep site equipment away from noise-sensitive areas;
- Where possible, loading and unloading will also be carried out away from such areas;
- Regular and effective maintenance by trained personnel will be undertaken to keep plant and equipment working to manufacturers' specifications.

[77] Institute of Agricultural Engineering, India in 2007: Development in Agricultural and Industrial Ergonomics (Volume – I), 2007

6.7.3.2 Operational Phase

The assessment concluded that noise impact of operating of gins might be quite high; therefore, the following specific mitigation requirements have been identified:

- Noise control arrangements for units and compartments with presence of personnel inside gins;
- Presence of personnel not directly involved in cotton ginning works in rooms with noisy equipment will be minimised;
- Maintenance, cleaning and repair activities will be conducted during routine breaks in noisy equipment operation;
- Hearing protection equipment will be provided for all personnel who may be present in rooms with noisy equipment;
- Quiet environment will be provided in rest rooms for operators of noisy equipment;
- Daily regimen, work and rest schedule will be adhered to;
- Workers exposed to noise will be subject to regular medical examinations for early identification of signs of potential health impact of noise.

However, it is expected that all equipment will be regularly serviced and maintained so that the effectiveness of any noise mitigation incorporated within the design of all components does not significantly decrease over the operational life of the items. Furthermore, requirements for the purposes of minimising the exposure of site operatives with regard to risks of potential hearing damage in the workplace will also serve to minimise impacts at or very close to the sources of noise.

6.7.4 Residual Impacts

The assessment has shown that no residual impacts are expected due to Project construction or operation. At the same time, risks control for gins operators' health should be in special focus of the management.

6.7.5 Proposed Monitoring and Reporting

All regular monitoring of operational noise levels should be carried out at the nearest sensitive receptor located 116 m to the north from the Denov gin site boarder and at the working places to prevent any impact Greenhouse Gas Assessment

Greenhouse gas emission assessment represented as a separate document in the Volume III of the ESIA documentation.

6.8 Greenhouse Gas Assessment

Greenhouse gas emission assessment represented as a separate document in the Volume III of the ESIA documentation.

6.9 Climate Resilience

6.9.1 Overview

The changing global climate and its manifestation in Uzbekistan may, through acute variations in climatic conditions and extreme natural phenomenon, present risks and resilience improvement opportunities within the agriculture and cotton production industry.

Our assessment highlights the need to understand the climate change risks to both agriculture (e.g. related to trends in temperature and water availability with effects on quality and yield) and supporting infrastructure[78] (e.g. effects of extreme weather events), as well as human resources. It identifies the relevant projected long-term variations to existing climate conditions and changes to the severity and frequency of extreme events that should be accounted for as risks and suggests some corresponding resilience and adaptation responses.

6.9.2 Scope of Work

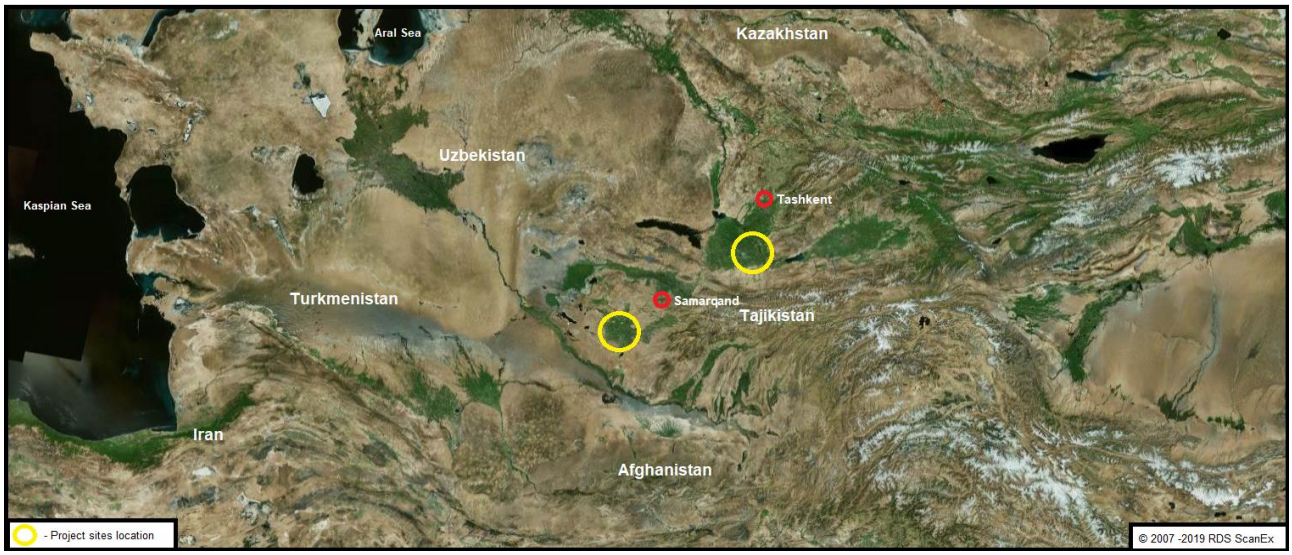
This supporting assessment of potential climate change impacts on the Project, is a contribution to the ESIA. The technical, spatial and temporal scope of this climate change assessment is described in this section.

Technical Scope

The technical scope for this assessment of climate change impacts and risks on the Project was defined as:

- Review and assess existing climate baseline of the planned Project area and its surroundings, including any environmental issues in the location of areas planned to be occupied by the Project;
- Assess climatic factors and climate change (e.g., including from land use, land use change & forestry, water resources, sectors of population more affected by climate change);
- Identify, assess and quantify the potential climate resilience impacts associated with the Project, and the associated risk;
- Determine significance of climate resilience issues in relation to trans-boundary impacts, in accordance with the Convention on ESIA in a Transboundary Context (Espoo Convention);
- Prepare climate resilience impact assessment report including recommendations on the Project design.

Map 6.11: Project Location



Source: http://kosmosnimki.ru/?permalink=4ZIRD

Chapter 1 of the ESIA Report provides a detailed overview of the existing and proposed operations, and the parties involved in the Project development, describes the need for the Project and explains why the choice of technology is most appropriate. A technical description of the Project is not repeated in this document.

The aim of an ESIA is to identify the potential environmental and social impacts of the Project and to define mitigation and management measures to avoid, reduce or remediate potential adverse environmental and

[78] Agriculture depends on a wide range of supporting infrastructure, including water resources, transport networks, power supply, finance, etc, and all of these are susceptible to climate risks, to a greater or lesser extent.

social impacts from the Project. The consideration of climate change risks and resilience is slightly different, because the focus is on the potential impacts of the changing climate on the performance of the Project over the long term. Therefore, the aim of this document is to provide a clear indication of the nature and extent of potential risks from the changing climate on the Project, and to give some suggestions on how these risks may be addressed to enhance the climate resilience of the Project.

Spatial Scope

Kashkadarya and Syrdarya regions of Uzbekistan have been selected by the GoU for the Project as traditionally specializing in the cotton sector. Indorama with the support from IFC completed a Feasibility Study in 2018 to confirm if proposed regions are good for cotton farming, understand local advantages and disadvantages and select districts for cotton farming.

The Feasibility Study considered and assessed the climate and soil conditions, rotation crops farmed, cotton varieties, vegetation periods, soil salinity issues, access of water resources and availability of local workforce.

The Project areas lie in the basins of Kashkadarya and Syr Darya Rivers, which are fed by fresh water from Pamir Mountains glaciers. These two regions are characterised by a developed agricultural sector and extensive irrigation systems for the cropping areas.

The Project involves two cotton farming schemes: direct farming by FE “Indorama Agro” LLC and contract farming that engages local farmers to grow and deliver cotton to FE “Indorama Agro” LLC.

The direct farming footprint extends to four administrative districts in Kashkadarya and Syrdarya regions and the Project established 22 cotton farming sub-districts to facilitate and manage farming operations across the total are of 54K ha in Nishon, Kasbi, Oqoltyn and Sardoba as detailed in the table below.

Table 6.45: Project farm footprints

Region	District	Sub-districts	Allocated land, ha
Kashkadarya	Kasbi	4	13,088
	Nishon	9	14,549
Syrdarya	Oqoltyn	5	12,770
	Sardoba	4	13,789
Total:		**22**	**54,196**

Source: FE “Indorama Agro” LLC

The Project direct farming in Kashkadarya region covers the total area of 27,638 ha in Kasbi and Nishon districts.

The footprint of the direct farming scheme in Syrdarya region extends to the total area of 26,559 ha in Oqoltyn and Sardoba districts.

Temporal Scope

The assessment of climate change impacts considers future projections of climate change appropriate to the lifetime of the Project. We understand that the full lifetime for the Project is 49 years. Climate change information has been assembled for the following periods, largely constrained by what data or studies are publicly available for review:

- **Baseline climate** – Observational data for key climate variables over the period 1950-2019, where available
- **Future climate** – Projections of climate variables (both absolute values and change factors)
  - Short term: 2020-2050

– Long term: 2050-2080

6.9.3 Limitations and Assumptions

The climate change risk and resilience assessment has been conducted with the following limitations and assumptions, among others:

- Data availability – climate projections for the regions limited to particular variables, time horizons and scenarios
- Limited access to raw climate data or observations
- No modelling of the impact of projected changes in climate on growth of the specific crop types selected in the Project Feasibility study was undertaken nor available
- The cumulative effect of temperature and water changes has not been assessed but could be important
- The assessment has not considered the impacts of changes in climate on other crop types, but it may be assumed that over time, with the benefit of ongoing agricultural scientific research, alternative crop varieties may become available which are more or less susceptible to possible changes in temperature and water.

Accordingly, future research, analysis or decision-making should be undertaken with an awareness of the uncertainties associated with climate projections and should consider the full range of literature, additional observational data, evidence and research available and any recent developments in these.

6.9.4 Methodology

This section outlines the methods used for both the observational review of baseline data and climate projections and the quantitative climate risk assessment.

Literature Review

All information used in the observational review of baseline and climate projections has been obtained by carrying out a literature review of professional and academic sources. No site visits or primary research has been undertaken.

All sources of information used are referenced in footnotes.

Assessment of Risk

The calculation method which is used to determine the level of risk associated with current and future climate impacts to the project is as follows:

Likelihood of impact (occurrence) x severity of impact = Risk

This approach is based on IFC, Organisation for Economic Co-operation and Development (**OECD**), European Commission (EC), Institute of Environmental Management & Assessment (**IEMA**) guidance.

The impact of the project on global climate change is not within the scope of this Assessment.

Likelihood

The likelihood of impacts on the project is determined by an evaluation of current and projected (future) climate data and literature. Using this data, a quantitative representation of the likelihood of impacts is established and presented in Table 6.46.

Table 6.46: Likelihood of impacts

Score	Likelihood of impact	Rating
3	Could occur several times a year OR Has happened several times in the past year and in each of the previous 5 years	Almost certain

2	May arise about once a year OR Has happened at least once in the past year and in each of the previous 5 years	Likely
1	May arise once in 5 years OR Has happened during the past 5 years but not in every year	Possible

Source: Mott MacDonald, 2019

Once the climate impact is scored, information on future change in climate (during the design life of the project) is included, through a summary of the future climate trends affecting the risk, and a confidence level in the direction of change.

Severity

The following scales were used to quantify the potential severity of climate impacts, see Table 6.47. The appraisal of the severity of impacts was determined based on a combination of expert review of available evidence and literature.

Table 6.47: Potential severity of impact to the Project

Score	Impact on the Project	Rating
3	Extensive change to cotton farming production / extensive disruption to farming practice improvement implementation.	Major
2	Some change to cotton farming production / some disruption to farming practice improvement implementation.	Moderate
1	Limited change to cotton farming production / little disruption to farming practice improvement implementation.	Minor

Source: Mott MacDonald, 2019

Risk

The combination of the likelihood and severity scores is used to determine the current and future level of risk to the Project. This is determined using Table 6.48.

Table 6.48: Risk Rating Scale and Grade definitions

Likelihood					Definition	Risk
	3	3	6	9		
	2	2	4	6	Risk is likely to managed by current design, proposed practices and procedures	Low
	1	1	2	3	Adaptation action may be required to enhance current design, practices and procedures	Medium
		1	2	3	Adaptation action will be required to enhance current design, practices and procedures	High
		Severity				

Source: Mott MacDonald, 2019

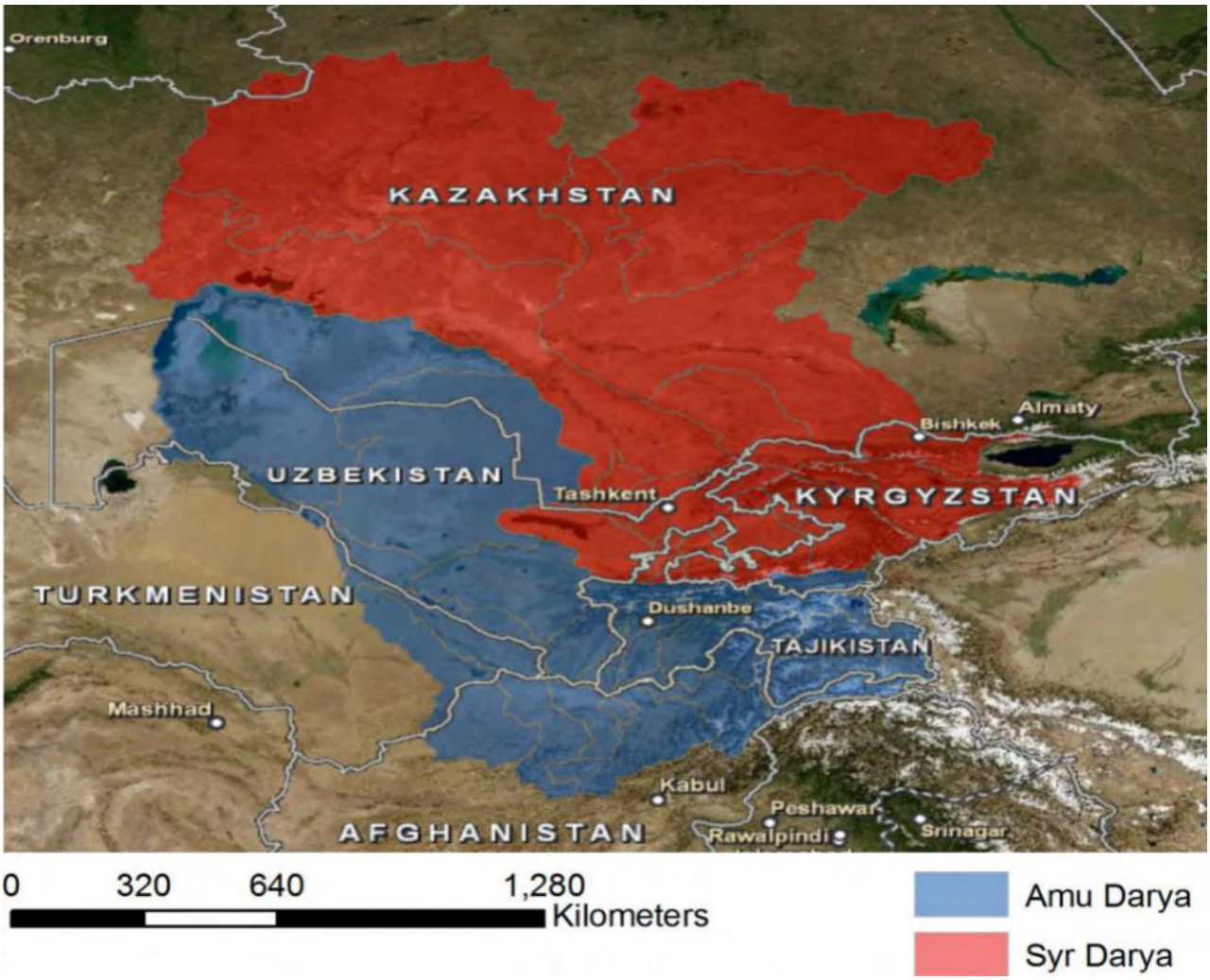
6.9.5 Current Climate and Projected Climate Change

This section provides information on current climatic conditions in Uzbekistan and provides a summary of the analysis of climate change projections and observational data for the area.

6.9.5.1 Current Climate

Current conditions for the Project areas based on findings from the feasibility study, including current climate conditions, can be found in section 7.8.1 of the Main Statement.

Map 6.12: Syr Darya and Amu Darya river basins



Source: ADB, 2012

Primary climatic characteristics of Uzbekistan are aridity, abundance of heat and sunlight, and sharp day-night and winter-summer temperature variations. Since 1938, all regions of Uzbekistan have experienced a trend of increased mean minimum and maximum temperatures for all seasons of the year. Mean summer temperatures (May to September) range from less than 22°C to 28-30°C in central districts and mean winter (December to early February) temperatures range from -9°C in northern districts of the country to 5-7°C in south-eastern districts. Precipitation falls predominately in winter and spring, and rainfall is extremely sparse between June to August.

6.9.5.2 Climate Projections

Climate projection data in this report has been collated from a number of different sources and shows analysis of different climatic models, emissions scenarios and projection timeframes.

The most recent official study setting out Uzbekistan's projections for climate change is the United Nations Environment Programme (**UNEP**) 3rd National Communication for the Republic of Uzbekistan. The communication details current (as of 2016) information on the climate in Uzbekistan, projected changes, climate impacts and risks and implementation strategies for reliance adaptation. The projections provided in the study were obtained by assessing 3 greenhouse gas scenarios (detailed in Table 6.49) with MAGICC5.3

(Model for the Assessment of Greenhouse-gas Induced Climate Change). The data provided shows projected change up to 2080.

Table 6.49: Emissions scenarios

Scenario	Description
WRE450	The *soft* scenario reflects global warming within the range 2ºC against pre-industrial period. It is scenario of CO_2 stabilization at the level of *450ppm* which envisages introduction of strict measures for restriction of GHGs emissions.
WRE750	*Moderate* scenario assumes CO_2 stabilization at the level of *750ppm*, which will lead to increase in global temperature 3ºC up to 2100.
A1FI	According to the *extreme* scenario, by year 2100, increase in global temperatures will reach 4.9ºC, and concentration of carbon dioxide will approach to *990ppm*.

Sources: Data from Third National Communication of the Republic of Uzbekistan, 2016

Additional information about projected climate change relevant to our study areas was found in the UN second National Environmental performance review, produced 2010, the Asian Development Banks 2012 regional assistance report on Water and Adaptation Interventions in Central and West Asia, the UNDP 2008 environmental profile of Uzbekistan and the Work Bank Group Uzbekistan Climate Data projections.

6.9.5.3 Temperature

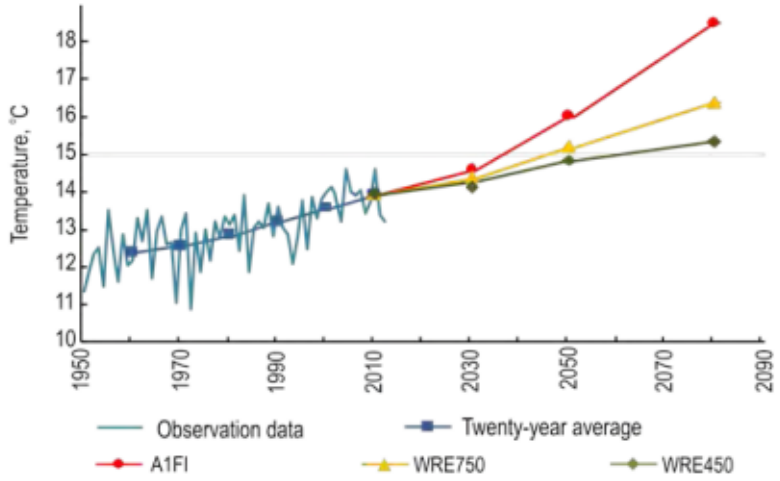
Uzbekistan is a region that currently experiences large variation in air temperature between seasons, with winters in some regions reaching -10°C and summer temperature exceeding 40°C for prolonged periods of time.

Projected changes from all models suggest that annual mean temperatures within Uzbekistan and the surrounding region will increase over the coming 50 years. Considering different greenhouse gases emission scenarios, presented below in Figure 6.8 annual temperature is projected to increase between 1-4°C by 2080. Considering only moderate emissions scenarios, such as WRE750 and A1b, annual temperature in Uzbekistan will rise by 2.5-3°C[79].

Projections presented from a number of models suggest seasonal temperature variations will also occur, with average lowest temperatures increasing. By 2050, average winter temperatures will range from -10 to 10°C and summer temperatures will range from 25-40°C[80]. Alongside this, studies show that the number of days of seasonal extremes will increase. At current, the annual mean number of hot days (≥40°C) is 5-10 days. According to projections[81], presented in figure below, the mean number of hot days will increase annually to around 20 by 2079[82].

[79] Regional Technical Assistance: Water and Adaptation Interventions in Central and West Asia. ADB, June 2012
[80] Regional Technical Assistance: Water and Adaptation Interventions in Central and West Asia. ADB, June 2012
[81] Projections provided using a ensemble of climate models and a RCP 6.0 (Medium-high emissions) scenario.
[82] World Bank Group. 2014. Uzbekistan Climate Data Projections. [Online]. [Accessed 24 September 2019]. Available from: https://climateknowledgeportal.worldbank.org/country/uzbekistan/climate-data-projections

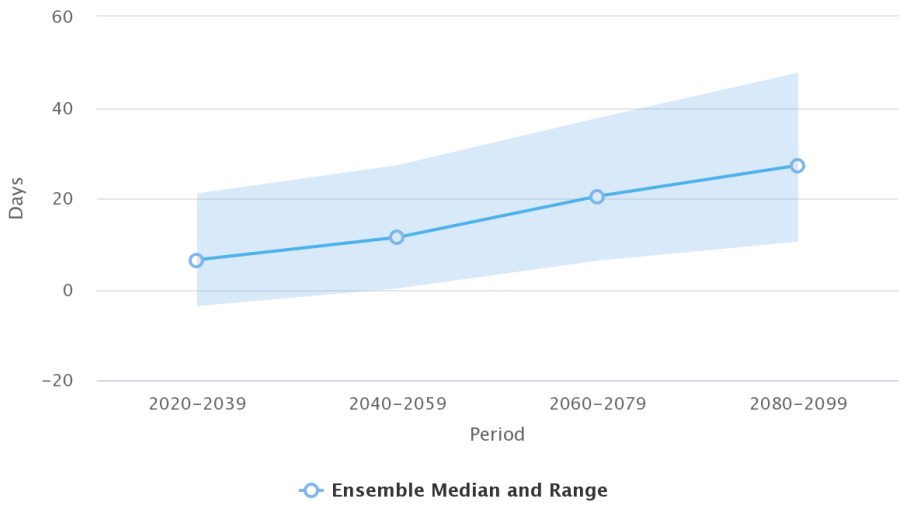
Figure 6.8: Projected average annual air temperature in Uzbekistan under different emission scenarios



Source: ADB, 2012

Increases in annual mean temperature, season temperature ranges and seasonal extremes are also projected to vary within Uzbekistan. Annual temperature increases by 2030 is projected to be lower in southern regions of the country compared to northern regions, but the number of days where temperature reaches extreme temperatures (≥40°C) will increase in the south[83].

Figure 6.9: Projected change in Hot Day (≥ 40 C) for Uzbekistan



Source: World Bank Group, 2014

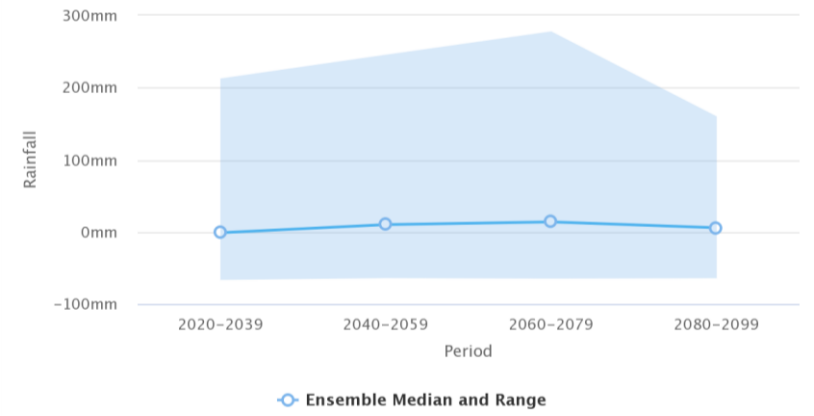
6.9.5.4 Water Availability

Climate change projections provided using a moderate/medium emissions scenario shows little change in the annual precipitation amount in Uzbekistan, with data presented in Figure 6.10 showing a maximum overall annual increase of 13.65 mm in 2060-2079. Despite little change in total annual precipitation, projections

[83] Environmental Profile of Uzbekistan. UNDP, 2008

suggest intra-year regime of rainfall and spatial distribution of rainfall will be more heavily impacted. Increased precipitation rates during winter months and decreased rates during all other months is projected by all emission scenarios for the northern territories of Uzbekistan, including the Syrdarya region. Retention of current rates of precipitation during winter months and decreased rates during all other seasons is expected for southern territories, including Kashkadarya region.

Figure 6.10: Projected change in Annual Rainfall Range for Uzbekistan



Source: World Bank Group, 2014

The increase in temperature will likely have a long-term impact on the water availability to regions supplied by glacier and now run off. In the short term, the increase will not impact water availability however in the long term run off will reduce, increasing the likelihood and severity of droughts within the country[84]. Moderate emission scenarios project increased rates of glacier shrinkage, potentially leading to their disappearance by 2050, with the first effected glaciers being in the Kashkadarya river basin[85].

Increase temperatures are also projected to snow formation and cover. Rising temperatures are predicted to substantially decrease snow cover in the higher reaches of the Kashkadarya and Surkhandarya river basins, decreasing overall snow melt run off within the catchments.

Changes in the supply of water to river across Uzbekistan, from increased variation in precipitation intra-year regimes and long-term reduction in snow melt run-off and glacier water supply, is projected to lead to a national decrease in river flow rates. Two key river catchments that are projected to see changes in river flow are the Amu Darya basin and the Syr Darya basin. The Amu Darya basin is projected to see decreased flows of up to 30% by 2050 and the Syr Darya basin is projected to see decreased flows of up to 25% by 2050. Projected reductions in flow for other key catchments are presented in Table 6.50. Reduction in flow in the Kashkadarya catchment is particularly significant, with annual inflow in the downstream area of the catchment dropping from 743 mm^3 in 2001-2010 to 51 mm3 in 2041-2050[86].

Table 6.50: Simulated average annual inflow to downstream areas (mm^3) for reference period 2001-2010 and future situation 2041-2050

Area	2001-2010 average annual inflow to downstream area (mm3)	Projected 2041-2050 annual inflow to downstream area (mm3)
Toktogul reservoir	16424	13576
Andijan reservoir	3481	2717

84 Environmental Performance Review – Uzbekistan. Second Review. UN, 2010
85 Third National Communication of the Republic of Uzbekistan under the UN Framework Convention on Climate Change. UNEP. Tashkent, 2016.
86 Regional Technical Assistance: Water and Adaptation Interventions in Central and West Asia. ADB, June 2012

Area	2001-2010 average annual inflow to downstream area (mm3)	Projected 2041-2050 annual inflow to downstream area (mm3)
Nurek reservoir	16772	9430
Tupalangsko reservoir	2107	456
Akhangaran reservoir	362	328
Zaamin reservoir	119	104
Gissarak reservoir	353	180
Pachkamar reservoir	552	477
Kulyab catchment	10960	6087
Kurgantube catchment	39500	38593
Dushanbe catchment	3203	1088
Surkhandarya upstream catchment	2322	737
Surkhandarya downstream catchment	8718	6619
Karakumkanal catchment	3309	2298
Kashkadarya upstream catchment	754	408
Kashkadarya downstream catchment	743	51
Zeravshan Valley catchment	6855	2918
Lebap upstream catchment	4335	1924
Fergana Valley catchment	10212	7492
Syrdaryo, Tashkent, Jizakh catchment	4947	3031
Charvak reservoir	3464	2489
Papan reservoir	674	562

Source: ADB, 2012

6.9.5.5 Extreme Weather Events / Natural Hazards

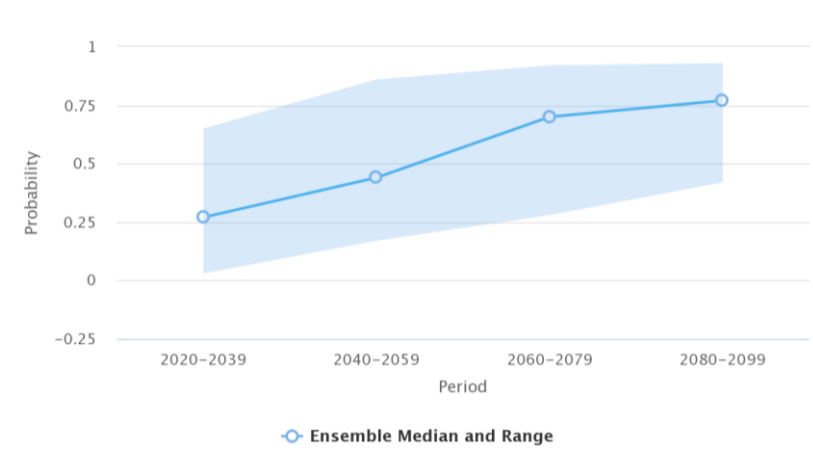
Changes to climatic factors, i.e. temperature, precipitation, snow melt, along with other anthropogenic factors, such as increases in water use and consumption, is projected to result in increased hydrological droughts within Uzbekistan. As displayed in Figure 6.11, likelihood of severe droughts will increase to a probability of around 0.70 by 2060-2079. Changes will particularly affect regions of the country which are reliant on the Amu Darya river, including Kashkadarya.

Projections also show Uzbekistan is vulnerable to other extreme weather and natural hazards such as mudflows and flooding. Due to high temperatures, average snowlines across the country will raise 200-300 meters by 2050[87]. Hill slopes which are currently covered by snow will be exposed to erosion and thawing of permafrost in the higher mountains will make the slopes instable and this will generate landslides and mudflows. in combination, variations in yearly rainfall regimes are predicted to increase the likelihood of ‘mud flood’ events. Overall, total mudflow risk is projected to increase from current levels by 1.74, 2.45 and 4.19 times by 2030, 2050 and 2080 respectively[88].

[87] Regional Technical Assistance: Water and Adaptation Interventions in Central and West Asia. ADB, June 2012

[88] Third National Communication, 2016

Figure 6.11: Projected change in Annual Severe Drought Likelihood for Uzbekistan

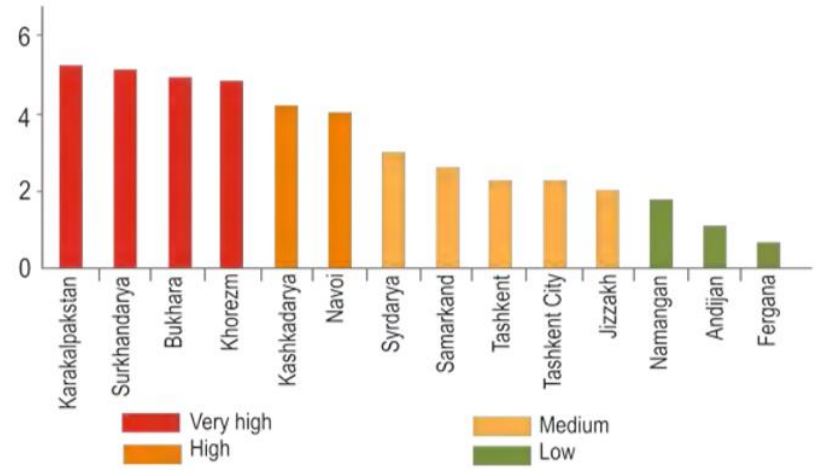


Source: World Bank Group, 2014

6.9.6 Climate Impacts and Risks

This section describes how the projected changes in climate may have impacts on the proposed project and assesses the risks associated with these impacts. The risks have been linked to changes in temperature, changes in water availability and changes to other natural hazards.

Figure 6.12: Ranking of Uzbekistan's territory by Degree of Vulnerability to climate change



Source: Third National Communication, 2016

According to Uzbekistan's Third National Communication[89], out of a selected group of countries within Europe and Central Asia (known as ECA), Uzbekistan is one of those most vulnerable to climate change. Figure 6.12 shows the vulnerability[90] of each of the administrative territories within Uzbekistan. 6 territories, including

[89] Third National Communication, 2016

[90] Assessment of vulnerability considers three indices: Vulnerability to impact (degree of climate change), sensitivity to climate change (considers factors that strengthen the effect of climate change, i.e. availability of water resources per capita) and adaption capacity (dependant on economic capabilities of the country).

Kashkadarya, are assigned very high or vulnerability to climate change, while 5, including Syrdarya, have medium vulnerability.

The following factors have been identified as key climate risks to the project based on the climate projection information analysed:

- Reduction of crop yield
- Disruption to soil regeneration and quality
- Effects on local population
- Damage to transport infrastructure

These risks will be considered in the climate risk assessment tables in the following sections. Climate risk assessment considers only the long-term climate projections (2050-2080).

6.9.6.1 Temperature

Climate projections across a variety of climate scenarios identify Uzbekistan as being particularly susceptible to climate change and show an expected temperature increase of between 1.5-3°C over the project's proposed 50-year lifetime. Increases in air temperatures, leading to what is known as 'air droughts', will cause an increase in the number of days on which temperature exceeds the reasonable growing temperature for many crops, including cotton, resulting in reduction of crop yields.

In general, in cooler regions, higher temperatures could benefit cotton yields by providing a longer growing season. But where temperatures already reach the upper limits of what cotton can withstand, cotton production could suffer. Even though cotton can grow in hot climates, its ability to survive rising temperatures depends on water availability and extreme weather patterns.

Studies such as the third National Communication[91], highlight that initially (up to 2050) this increase in temperature will have a positive effect on cotton growth in some regions of Uzbekistan. In northern regions, such as Syrdarya, projections show a rise in temperature will increase the growing days for crops, including cotton by 11-19 days. This will result in improvements in cotton ball formation, ripening and opening and is likely to improve quality and crop yield.

However, projected increase in number of days at extremely high temperatures from 2050-2070 (≥40 °C) will lead to crop vulnerability in southern regions, including Kashkadarya[92]. Increase temperatures and evapotranspiration lead to air droughts and shortage of soil moisture, reducing the crops quality and yield. Analysis shows that yield loss in southern regions, due to extreme temperatures, could be as high as 27-35%.

Rising temperature in Uzbekistan could also potentially impact settlements and health of workers in the Project's radius. Studies have shown that heat extremes projected are likely to have significant implications for human health; causing increase in air born viruses, heat stroke/exhaustion and complications in pregnancy and childbirth[93].

Alongside effecting agriculture, settlements and health, rising temperatures could also affecting transport infrastructure in the country, specifically that required by the client for the transportation of crops, supplies and infrastructure required during the farming process. Increased numbers of 'hot days' could result in damage to rail and road materials, particularly in the southern part of the Kashkadarya region, due to softening, deformation or cracking of top layers of pavement and track buckling[94].

[91] Third National Communication of the Republic of Uzbekistan under the UN Framework Convention on Climate Change. UNEP. Tashkent, 2016.
[92] Environmental Performance Review – Uzbekistan. Second Review. UN, 2010
[93] Reyer, C.P., Otto, I.M., Adams, S., Albrecht, T., Baarsch, F., Cartsburg, M., Coumou, D., Eden, A., Ludi, E., Marcus, R. and Mengel, M., 2017. Climate change impacts in Central Asia and their implications for development. Regional Environmental Change, 17(6), pp.1639-1650.
[94] International Climate Change Adaptation Framework for Road Infrastructure. World Road Association, 2015; W B. Moving Toward Climate-Resilient Transport, 2015

Table 6.51 presents key risks that have the potential to affect the Project from increases in extreme temperatures and provides an indicative assessment of the relative significance of these risks.

Table 6.51: Climate risk – temperature

Variable	Likelihood	Potential impact	Severity	Climate Risk	Comments
Increasing number of 'hot days' (≥40°C)	Almost Certain (3) – Could occur several times a year, or has happened several times in the past year and in each of the previous 5 years	Reduction of crop yield	Major (3)	High (9)	Despite adaptions through the cotton breeding programme, it is assumed preferred growing temperature will remain the same and therefore the severity of the impact remains high.
		Disruption to soil regeneration and quality	Minor (1)	Medium (3)	Sustainable farming practices planned, i.e. rotation of cotton with other crops such as winter wheat and mungbean, as part of the scheme should reduce the severity of impact.
		Effects on local population	Minor (1)	Medium (3)	Education on sustainable farming practices will transform the current farming practices, limiting heat related health risk such as heat stroke and exhaustion and reducing severity of the impact.
		Damage to transport infrastructure	Moderate (2)	High (6)	Transportation of harvested cotton, rotation crops and farming infrastructure is a key part of ensuring success of the project. Therefore, damage to transport infrastructure is a high climate risk.

Source: Mott MacDonald, 2019

6.9.6.2 Water Availability

Many regions within Uzbekistan experience water vulnerability and insufficient water availability due to changes that have occurred to the area's climate in past decades. Data shows that the annual total water deficit in Uzbekistan in 2005 was estimated at 2 km^3. According to projections, it is possible that the water deficit will increase to 7 km^3 by 2030, rising to as much as 13 km^3 by 2050[95].

Increases in the water deficit, due to long term reduction in precipitation, river flow levels and water supply from snow melt and glacier run-off, is projected across all climate scenarios analysed.

Alongside the projected increase in water vulnerability, increased temperatures, will lead to changes in the level of irrigation required for the majority of crops, including cotton, in all regions of Uzbekistan. Irrigation norms for the majority of crops, including cotton, wheat and mungbean, will be increased by 5.8-7.3% by 2030 and by 9.7-15% by 2050. For cotton specifically, analysis shows irrigation required in projected to increase by 5-7.2% by 2030 and 8.4-15.2% by 2050 in desert and steppe areas and by 3.7-4.9% by 2030 and 5.6-9.9% by 2050 in piedmont areas[96].

Insufficient water availability, resulting from increased demand for water for agriculture irrigation and reduction in water recourses, is projected to result in reduction in yield in the majority of crops by 9-15% by 2050. For cotton in particular, crop yield reduction due to insufficient water availability is projected to be 4-5% by 2030 and 6-10% by 2050.

[95] Environmental Performance Review – Uzbekistan. Second Review. UN, 2010
[96] Third National Communication, 2016.

Crop yield reduction due to reductions in water availability could damage not only the cotton production sector but also local food security nationally. A decline in food security would negatively human health, particularly in rural farming settlements such as those within and surrounding the project area[97].

Table 6.52 presents key risks that have the potential to affect the Project from changes to rover flow rates and provides an indicative assessment of the relative significance of these risks.

Table 6.52: Climate risk – water availability

Variable	Likelihood	Potential impact	Severity	Climate Risk	Comments
River flow rate reduction (from Glacier shrinkage / disappearance and Snow melt reduction)	Almost Certain (3) – Could occur several times a year, or has happened several times in the past year and in each of the previous 5 years	Reduction of crop yield	Major (3)	High (9)	Despite adaptions through the cotton breeding programme, it is assumed irrigation norms will remain the same and therefore the severity of the impact remains high.
		Effects on local population	Minor (1)	Low (2)	Reduction in food security likely to impact project workers and local farmers, however will only have limited impact on project directly.

Source: Mott MacDonald, 2019

6.9.6.3 Natural Hazards

Uzbekistan is at risk of hydrometeorological hazards and natural disasters, which primarily affect the agricultural sector through seasonal flooding and periods of drought. Rising temperatures and increasing water vulnerability as a result of climate change may lead to an increase in the severity and length of droughts within Uzbekistan and result in negative impacts on a range of receptors including crop productivity and yield, soil quality and food security and human health.

Landslides, floods, mudflows, and avalanches can damage farming and transport infrastructure, as well as settlements, and lead to economic losses in the agricultural sector. Extreme rainfall directly affects agriculture where it can damage crop, flood fields and streams, and the water can strip soils of their nutrients or the soil mass itself. With climate change, there may be an increase in severity or frequency of flooding and mudflow events, which could damage crop yields and productive farming land, cause serious damage to settlements and buildings and increase risk of injuries and fatalities in the population of the affected area[98].

Increased severity of events could also inundate key transport routes (both roads and trainlines), blocking roads and rail routes, destroying tracks and leading to overall deuteriation of transport infrastructure[99]. This would specifically hinder the projects through reduced access to proposed sites and inability to transport required resources, both labour and cotton farming materials to and from its various locations.

Table 6.53: Climate risk – natural hazards

Variable	Likelihood	Potential impact	Severity	Climate Risk	Comments
Drought		Reduction of crop yield	Major (3)	High (9)	Despite adaptions through the cotton breeding programme, it is assumed preferred growing temperature will

97 Reyer, et al. 2017. Climate change impacts in Central Asia and their implications for development. Regional Environmental Change,

98 Reyer, et al. 2017. Climate change impacts in Central Asia and their implications for development. Regional Environmental Change,

99 International Climate Change Adaptation Framework for Road Infrastructure. World Road Association, 2015; W B. Moving Toward Climate-Resilient Transport, 2015

	Likely (2) - May arise about once a year OR Has happened at least once in the past year and in each of the previous 5 years				remain the same and therefore the severity of the impact remains high.
		Disruption to soil regeneration and quality	Minor (1)	Low (2)	Sustainable farming practices planned, i.e. rotation of cotton with other crops such as winter wheat and mungbean, as part of the scheme should reduce the severity of impact.
		Effects on local population	Minor (1)	Low (2)	Reduction in food security likely to impact project workers and local farmers, however, will only have limited impact on project directly.
Flooding and Mudflows /slides	Likely (2) - May arise about once a year OR Has happened at least once in the past year and in each of the previous 5 years	Reduction of crop yield	Moderate (2)	Medium (4)	Flooding and/or mudflow events likely to be localised, therefore reduces severity across whole project.
		Effects on local population	Minor (1)	Low (2)	Increased frequency of mudslides and flows rises potential for injury or fatalities. However, unlikely directly impact project staff.
		Damage to transport infrastructure	Moderate (3)	High (6)	Transportation of harvested cotton, rotation crops and farming infrastructure is a key part of ensuring success of the project. Therefore, damage to transport infrastructure is a high climate risk.

Source: Mott MacDonald, 2019

6.9.7 Climate Resilience

This section offers suggestions of adaptation measures that could be considered to enhance the resilience of the Project against the identified climate risks.

6.9.7.1 Adaptation in Uzbekistan's Agriculture Sector

For the agriculture sector in general, Uzbekistan's 3rd National Communication emphasises the need to address risks associated with reduction in water availability. Specifically, it notes that the key task in resilience is to increase efficiency of use of available water and land resources without threat to sustainable functioning of vital ecosystems. The three aspects of improving land and resources management, increasing agricultural productivity and water saving policies could increase the adaptive capacity of the country. Principles of integrated water resource management being actively introduced across the country will promote efforts towards water efficiency and management of dry years. Other national activities concerned with water management could provide some general resilience to the Project, such as:

- Inter-basin runoff redistribution is used for improvement of water availability in regions with water deficiency (e.g. parts of districts in the Kashkadarya river basin receive water through canals form Zerafshan river)
- Water Consumer Associations – non-governmental organisation for operation and maintenance of on-farm irrigation and drainage systems

Alongside water management measures, improvements in agricultural practices could offer adaptation to the impacts of climate change, such as drip and sprinkler irrigation, no-till farming and improved drainage, utilization of the best available germplasm or other seed development, optimizing fertilizer use, innovative crop protection technologies and extension services. Costs of such measures vary, but could be relatively cheap

compared to some water supply measures.[100] The ADB has noted that some productivity measures for adaptation in agriculture could result in a net cost saving.[101]

Research and innovation in Uzbekistan aim at improvements in irrigation technologies to deliver water saving benefits and increased irrigation efficiency. Increased funding for agricultural science is supporting development of intensive type cotton varieties that can retain quality under conditions of reduced water availability. Breeding cotton for heat tolerance and resistance to drought, pests, weeds and diseases is an essential part of a multi-level solution.[102]

6.9.7.2 Specific Considerations for the Project

According to the 3rd National Communication, the "Central Asian Countries Initiative for Land Management" (**CACILM**) program identified the following categories of adaptation activities relevant to Uzbekistan's agriculture and land management sectors: improvement of irrigated land fertility, prevention of erosion, improvement of crops sowing and land tillage methods, agricultural afforestation, water demand management, improvement of pasture productivity/forage production, capacity building of land users and environmental education. There is no evidence that the relevance or suitability of such measures has been considered in the Feasibility Study for the Project. Given the potential for impacts of climate change in the Project areas over the next 50 years, we recommend further work to identify a range of measures that could be appropriate to integrate into the Project at an early stage or more flexibly across the lifetime of the Project.

Table 6.54 is an indicative, non-exhaustive, mapping of some broad categories of adaptation measures that could be relevant for the Project, in response to the underlying drivers of potential climate impacts.

Table 6.54: Relevance of adaptation options to the causes of climate risks to the Project

	Extreme high temperatures	Reducing water availability	Floods and hazards
Improved agricultural practices – efficiency of irrigation		✓	
Improved agricultural practices – crop varieties	✓	✓	
Increased reuse of water		✓	
Increased reservoir capacity		✓	✓
Reduce water demand from other economic activities		✓	
Improved building types	✓		✓
Improved transport networks	✓		✓

While changes to technical aspects of the Project can enhance resilience from the outset, increasing adaptive capacity is another way to improve resilience. Some technologies may be more flexible than others to allow adaptation over time. Training and skills development may improve operations and farm management, such as in dealing with extreme weather, or ensuring efficient water use.

[100] ADB 2012
[101] when operating savings of the measures outweigh annualized capital costs – from ADB 2012
[102] https://www.greenbiz.com/article/why-climate-change-material-cotton-industry - accessed 24/09/2019

Adaptation measures may also deliver co-benefits for the Project, such as enhanced productivity (e.g. in the case of new cotton varieties) or lower costs (e.g. in the case of reduced water demand).

Monitoring of agroclimatic variables, including local records of weather indicators and crop yields, together with periodic review of latest available climate change projections and local development plans can together inform management and planning, and help drive decisions to gradually introduce changes in crop varieties or agricultural practices.

It is important to recognise that there may be limits to adaptation over the longer term and under the more extreme scenarios of climate change. For example, despite technological advances in the development of new drought-resistant cotton varieties and efficient irrigation, there may be combinations of extreme temperatures coupled with low water availability beyond which cotton production becomes unviable. At this stage it is not possible to identify such limits explicitly.

6.9.7.3 Transboundary concerns

The impacts of climate change are experienced across regional and national borders, and consequently the adaptation needed to cope with the impacts may require transboundary cooperation.

For the Project, given the cotton farming dependence on water resources in river basins shared across several neighbouring Central Asian countries, transboundary aspects of climate resilience may be significant.

- Key transboundary climate risks relate to water availability in the eastern Project area. Decrease in run-off in both Amu Darya and Syr Darya basins is likely to increase competition for water between developing sectors of the economy. This competition for water in the future might not be restricted only to the parts of these major basins in Uzbekistan but could also spill over into neighbouring countries, upstream and downstream of the Project areas.
- A secondary concern relates to the potential for extreme weather events and increases in climate-related natural hazards to affect road transport and connections into regional and international trade.
- Resilience enhancements to address these issues may require transboundary engagement. For more than a decade, Uzbekistan has benefited from involvement in multi-agency multi-country projects and programmes supportive of adaptation in the Central Asia region, such as the “Central Asian Countries Initiative for Land Management” (**CACILM**) and “Central Asian Regional Centre for Drought Control”.

6.9.8 Summary

The summary of relevant climate change, impacts, risks and resilience considerations is presented in this section. We have also identified areas of further work that would improve the understanding of how the Project could prepare for future climate risks.

6.9.9 Climate change

Analysis of data has shown the following projected changes in climate relevant to the project:

- Rising annual mean temperature
- Increasing number of ‘hot days’ (≥40°C)
- Reduction in glacier over and snow melt run off
- Reduction in river flow rates
- Potential increase in frequency and severity of droughts
- Potential increase in frequency and severity of floods and mudslides/mudflows
- Potential increase in frequency and severity of floods and mudslides/mudflows

6.9.10 Risks and resilience

Overall, we consider there is potential for climate change to present a medium risk to the Project. This is based on the following rationale:

1. Cotton farming is a climate-sensitive sector and will be directly affected by changes in temperature and water availability.
2. Climate projections for the regions in which the Project is located indicate changes in the frequency of extremely hot days, and in water run-off in the glacier-fed basins over the long lifetime of the project.
3. There is a large potential for adaptation within the sector and the Project over time, with many options that could be introduced relatively quickly.
4. Broader issues around water availability will require regional co-operation and integrated management at a basin scale.

The key impacts from climate change on the Project identified in this report are:

- Impacts on crop yield and quality
- Disruption to soil regeneration and quality
- Effects on local population
- Damage to transport infrastructure
- Impacts on cotton, wheat and mungbean crop yield and quality
- Disruption to soil regeneration and quality
- Effects on local population, including workers
- Damage to transport infrastructure

Given current projections of climate change in Uzbekistan, we consider it is likely that adaptations to address impacts arising from increasing temperatures and reducing water availability will be needed during the lifetime of the Project. Many different options for adaptation already exist and new technologies are being developed, and so it may be relatively straightforward to introduce adaptation measures flexibly over time. However, these may require additional costs, and may require wider engagement, including potential for transboundary engagement in the case of the broader aspects of water management.

We have identified a range of possible adaptations that the Project could consider incorporating:

- Improved agricultural practices – efficiency of irrigation and water re-use in farm processes
- Improved agricultural practices – crop varieties and cropping methods
- Improved agricultural practices – land management
- Improved integrated regional water management
- Improved transport networks
- Improvements to industrial and residential buildings
- Training and education of workers and local population

6.9.11 Limitations and assumptions of the study

Although climate change may have a particularly significant impact on water resources in the Central Asia region, understanding of the scale, extent, timing and direction of these impacts is still relatively poor, due to lack of studies, and also because the hydrological regimes of Uzbekistan's two major rivers, Syr Darya and the Amu Darya, are complex.

All assessments of future impacts of climate change are subject to uncertainty from various sources. In the context of the Project, uncertainty about the rate and timing of climate changes leads to uncertainty over the direction of impacts on water availability. Because the impact of temperature increases on cotton growth is

also partly dependent on water availability, the delicate interplay between these different aspects of climate change could result in quite different extent or timing of impacts on the Project.

There remain gaps in the relevant evidence base, both in relation to the local circumstances for the Project and in the impacts of climate change in the cotton production sector, especially over longer timescales. Our assessment had the following limitations:

- Data availability: climate projection information has only been available at a regional level and limited in terms of the climate variables included, time horizons and underlying emissions scenarios. Access to raw climate data or local observations has been limited
- No modelling of the impact of projected changes in climate on growth of the specific crop types selected in the Project Feasibility study was undertaken nor available
- The cumulative effect of projected temperature and water changes has not been assessed but could be important.
- No integrated assessment modelling has been undertaken. Water availability to the Project over the longer term is likely to be modified by the behaviour of other economic sectors in Uzbekistan and neighbouring countries as they develop and respond to climate change.
- The assessment has not considered the impacts of changes in climate on other cotton varieties, but it may be assumed that over time, with the benefit of ongoing agricultural scientific research, alternative varieties may become available which are more or less susceptible to possible changes in temperature and water.

6.9.12 Recommended further work

Understanding of the climate risks faced by the Project and the opportunities to increase resilience could be improved if further research in the following areas were to become available:

- Projections of climate change, including extremes as well as averages, out to 2080 or 2100
- Detailed hydrological modelling at basin level, incorporating various climate change and economic development scenarios
- Analysis of the combined impacts from temperature and drought on the cotton varieties selected for the Project
- Further research to identify the limits to adaptation over the longer term for cotton production in the Project areas under the more extreme scenarios of climate change.

In relation to the Project itself, the following further work is recommended in response to the potential risks from the changing climate:

- Clarify whether possible adaptation measures can be included in Project design, and how innovations could be introduced over time (e.g. more efficient irrigation technologies)
- Clarify what monitoring of agroclimatic variables, including local records of weather indicators and crop yields will be undertaken as part of Project operations to inform management and planning
- Undertake site-level studies and stakeholder interaction to understand the current vulnerability to high temperature, droughts and extreme weather / hazards
- Analysis on proposed crop varieties to understand their resilience to projected changes in climate
- Research what alternative crop varieties with higher tolerances might exist and how rapidly they could be deployed in response to the changing climate
- Confirm alignment of detailed plans for the Project with national policies and commitments on climate change and regional water management
- Engage with local authorities, planners and investors to understand wider plans for development in the catchment that may affect the exposure of Project sites to climate-related risks – e.g. proposals for

alternative economic activity that may compete for water demand (locally or upstream), proposals for improved transport networks that will enhance resilience to hazards, etc

- Seek opportunities to participate in multi-agency multi-country projects and programmes supportive of adaptation in the Central Asia region.

6.10 Cultural Heritage

6.10.1 Introduction

This chapter describes the potential impacts of the operation of the Project upon known and potential cultural heritage aspects of the area and sets out the proposed mitigation in order to minimise the impact of the Project upon the cultural heritage resource. The cultural heritage baseline assessment identified the existing cultural heritage conditions within and adjacent to the Project area and the general nature of archaeological deposits in Uzbekistan focusing on sites identified in Syrdarya and Kashkadarya regions. This chapter assesses the impact of the Project on identified cultural heritage resources, addressing direct impacts on cultural heritage assets (disturbance or destruction through construction / excavation) and indirect impacts (setting and pollution at tangible cultural heritage sites or loss / damage to intangible forms of culture).

6.10.2 Methodology and Assessment Criteria

6.10.3 Spatial and Temporal Scope of Assessment

The zone of influence will encompass the (i) primary Project area and related facilities that the client develops or controls, such access roads and construction camps (ii) areas potentially impacted by cumulative impacts from further planned development of the Project; and (iii) areas potentially affected by impacts from unplanned but predictable developments caused by the Project that may occur later or at a different location. The zone of influence does not include potential impacts that would occur independently of the Project.

6.10.4 Legislation

Law on Cultural Heritage of 18.04.2018 regulates cultural heritage issues in Uzbekistan. The law establishes procedures for the protection of cultural heritage and permitting for archaeological research. The purpose of this law is to regulate relations in protecting and use of cultural heritage objects that are the national heritage of the people of Uzbekistan.

6.10.5 Impact Assessment Criteria

An assessment of the significance of impacts with regards to cultural heritage and archaeology to be made for the construction, operational and decommissioning phases of the Project. The significance of potential impacts is a function of the presence and sensitivity of archaeological receptors, and the magnitude (duration, spatial extent, reversibility, likelihood and threshold) of the impact.

Sensitivity criteria

The sensitivity of the archaeological potential for a site is shown in the table below.

Table 6.55: Criteria for determining sensitivity

Sensitivity	Description
High	Sites of the highest importance, e.g. World Heritage Sites (including nominated sites), assets of acknowledged international and/or national importance and assets that can contribute significantly to acknowledged international research objectives
Medium	Undesignated archaeological sites; well preserved structures or buildings of historical significance, historic landscapes or assets of a reasonably defined extent and significance, or reasonable evidence of occupation / settlement, ritual, industrial activity.

Sensitivity	Description
Low	Comprises undesignated sites with some evidence of human activity but which are in a fragmentary or poor state or assets of limited historic value, but which have the potential to contribute to local research objectives, structures or buildings of potential historical merit
Negligible	Historic assets with very little or no surviving archaeological interest or historic buildings and landscapes of no historical significance.

Magnitude criteria

The degree or magnitude of effect is determined through consideration of the nature, scale and extent of effect. The criteria for determining magnitude are shown in the table below.

Table 6.56: Criteria for determining impact magnitude

Magnitude	Definition
Major	Severe damage or loss of the cultural heritage resource
Moderate	A high proportion of the cultural heritage resource damaged or destroyed
Minor	A small proportion of the cultural heritage resource damaged or destroyed
Negligible	The cultural heritage resource will not be affected, because of distance from the development, or method of construction

Significance

The significance of the effect is dependent upon the importance of a particular site and the amount of potential damage. Chapter 3 presents the manner in which the significance of impacts is determined by the interaction between the magnitude of impacts and the sensitivity of receptors affected.

6.10.6 Syrdarya Cultural Heritage

Syrdarya region borders with Kazakhstan, Tajikistan, Tashkent region, and Jizzakh region. It consists of 3 cities, 2 towns under district authority, 8 districts and 21 urban- type communities. Regional centre – Gulistan city. There are 67 cultural heritage sites in the region. Of these, 18 – archaeological, 14 – architectural, 35 – monuments of monumental art. On the way of the Great Silk Road in the territory of the Syrdarya region, there is a unique historical hydrotechnical structure "SARDOBA", which is a closed pond with a dome, which was erected for special storage of water in regions where there is not enough water. On the left bank of the Syrdalya river, along a road bridge over a length of about 800 meters, there is a large tugai forest. The forest is inhabited by a unique and valuable flora and fauna. All animals typical of tugai live here: pheasants, jackals, hares; in Saykhun, a family of wild boars that arrived on the territory from the neighboring Dalverzin took root. The "bird" world is richly represented: here you can meet birds from the pigeon family, as well as quakes and cormorants. Tugai forests are a kind of biological oasis, becoming a habitat for birds and animals. Reducing their area can lead not only to the irretrievable loss of relic plants and animals.

6.10.7 Kashkadarya Cultural Heritage

In the 200th km from Termez to the north-west is the Kashkadarya region. This is a valley located on both banks of the Kashkadarya River. From the east it is limited by the spurs of the Gissar range, from the north – by the Zeravshansky (Pamir-Alay mountain system). It ideally combines the snow-capped peaks of the mountains with numerous waterfalls from small mountain streams and fragrant flowers in the valley, waterless steppes and sand dunes brought from the desert located on the territory of Turkmenistan. The region is rich in minerals, in particular, oil deposits. The administrative center of the region is the city of Karshi. This is a modern industrial center of Uzbekistan, which has a long history. The second largest city and historical significance of Kashkadarya is Shahrisabz, the birthplace of Amir Timur (Tamerlane). In the XIV-XV it was the main city of the Kesh region, the patrimony of the Turkic-Mongolian tribe Barlas, to which the terrible Tamerlane belonged. Under Timur, Shakhrisabz is experiencing an unprecedented flourishing and is being built up with magnificent monumental buildings. From the XVI century the city gradually fell into disrepair. At the beginning of the XIX century – this is the residence of the local Bek. Now it is a modern city with 25 centuries of past.

6.10.8 Assessment of Impacts

6.10.9 Land Development, Preparation and Construction Phase Impacts

No Project infrastructure or construction activities will occur within 200m of any known cultural heritage features and therefore there will be no direct impact to known cultural heritage assets.

There is the low potential for previously undiscovered archaeological remains (buried archaeology) to be impacted by the preparatory site works at the Project site location. At the same time, ploughing depth will be less than 60 cm in the top soil level and the magnitude of the potential risks for buried archeological or human remains will be negligible therefore.

6.10.10 Operation Phase Impacts

The operation of the proposed Project will unlikely impact any known or unknown archaeological remains and artefacts as, should any be present, they will have been disturbed and removed during the construction phase. Therefore, the impact is considered negligible. At the same time, ploughing depth will be less than 60 cm in the top soil level and the magnitude of the potential risks for buried archeological or human remains will be negligible therefore.

6.10.11 Closure and Decommissioning Phase Impacts

Decommissioning the Project will have no impact upon the cultural heritage resource because the activities associated with decommissioning will be confined to areas previously impacted during the construction phase of the Project.

6.10.12 Mitigation and Enhancement Measures

In the event of unknown archaeological finds or features being identified during the course of Project construction groundworks, an emergency procedure will be required in order to stop work and allow for the assessment of the archaeological potential of the remains. A ‘chance finds procedure’ will be included within the CEMP. If buried archaeological remains are of significance, then a system will be put in place to mitigate harm. This may involve protecting the remains or a system to excavate and record the remains.

6.10.13 Residual Impacts

No other developments near the site have been identified with potential to generate cumulative effects with the Project.

6.10.14 Proposed Monitoring and Reporting

Monitoring is not required so far/.

7 Glossary of Terms

Term	Definition
Census	A complete count of the population affected by a project activity including collation of demographic and property information. This will identify and determine the number of displaced persons (DP)and the help to identify the nature and levels of impact.
Community	Usually defined as a group of individuals broader than the household, who identify themselves as a common unit due to recognised social, religious, economic or traditional government ties, often through a shared locality.
Compensation	Payment in cash or in kind for an asset or resource acquired or affected by the project.
Contract farming	A scheme when FE “Indorama Agro” LLC engages local cotton farms to grow and deliver harvested cotton to the Company via supply contracts for processing.
Contract farmers	Managers (heads) of cotton farms contracted by FE “Indorama Agro” LLC to grow and supply harvested cotton to gin plants
Contracted farms	Cotton farms contracted by FE “Indorama Agro” LLC to grow and supply harvested cotton to gin plants operated by FE “Indorama Agro” LLC
Cotton cluster	A transaction whereby the government allocates a defined area to a private investor who in return commits to growing cotton (either by direct farming and/or by contracts with existing farmers) and to establishing processing and/or manufacturing facilities in the local area.
Dekhkan farm	A private small-scale family-based farm in lifetime inheritable possession of former workers of agricultural enterprises or rural families based on household plot operation mainly by family members with option to hire seasonal workers to farm mainly wheat, vegetables, fruits and livestock.
Direct farmers	Local farmers who are engaged in cotton farming as employees of FE “Indorama Agro” LLC
Economic displacement	Loss of assets or access to assets that leads to loss of income sources or other means of livelihood (see ‘livelihood’ below).
Entitlements	Compensation due to displaced persons to mitigate losses in cash or in-kind. Entitlements may also include livelihood restoration measures such as training or provision of crop insurance.
Farm	A business organised as a legal entity for the production of agricultural products and other agricultural activities and operating leased land
Farm workers	Permanent staff of a cotton farms, including contracted farms, helping the farm manager (head) to operate the farm
Grievance Mechanism	The process by which DPs can raise their concerns and grievances to project staff.
Hokimiyat	Local government in the districts and cities of Uzbekistan
Household	A group of persons living together, who share the same cooking and eating facilities, and form a basic socio-economic and decision-making unit. One or more households may occupy a house.
Host community	People living in or around areas to where physically displaced people will be resettled.
Involuntary resettlement	Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in physical or economic displacement. This occurs in cases of (i) lawful expropriation or temporary or permanent restrictions on land use and (ii) negotiated settlements in which the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail.
Land	Agricultural and/or non-agricultural land which may be required for the project.
Land acquisition	Includes both outright purchases of property and acquisition of access rights, such as easements or rights of way
Lease	A l contractual arrangement whereby one party provides land (or services) to another for a specified time in return for a periodic payment. Land, property, buildings and vehicles are assets that are often leased.

Term	Definition
Livelihood	Refers to the full range of means that individuals, families, and communities utilise to make a living, such as wage-based income, agriculture, fishing, foraging, other natural resource-based livelihoods, petty trade, and bartering.
Livelihood restoration	The measures required to ensure that displaced people have resources to at least restore, if not improve, their livelihoods.
Livelihood restoration plan (LRP)	A document designed to mitigate the negative impacts of economic displacement. It establishes the entitlements of affected persons and/or communities are provided in a transparent, consistent and equitable manner.
Mahalla	Community self-government units in the Project area
Podrachi	An Uzbek word for local households with long standing arrangements with local farmers to weed cotton
Reallocation	The process of transferring the land tenure from the farms (legal entities with Land Lease Agreements) to the Government who then transferred the land in an LLA in the name of the Project Company
Replacement cost	Equal market value of the asset plus transaction costs. For agricultural land, replacement cost is the market value of land of equal productive use or potential located near the affected land, plus the cost of preparation to levels similar to or better than those of the affected land, plus cost of any registration and transfer taxes. In determining replacement cost, depreciation of the asset and value of salvage materials are not considered nor is the value of benefits to be derived from the project deducted from the valuation of an affected asset.
Resettlement	Resettlement refers to both physical displacement (relocation, loss of residential land, or loss of shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) because of acquisition of land or restrictions on land use or on access to legally designated parks and protected areas. These losses and restrictions are covered whether they are full or partial, permanent or temporary.
Resettlement Action Plan (RAP)	A document designed to mitigate the negative impacts of physical displacement, identify development opportunities, develop a resettlement budget and schedule, and establish the entitlements of all categories of affected persons (including host communities).
Resettlement Policy Framework (RPF)	An instrument to be used throughout project implementation when resettlement takes place at different sites and at different times. The RPF sets out the resettlement objectives and principles, organisational arrangements and funding mechanisms for any resettlement, that may be necessary during Project implementation. The RPF guides the preparation of the RAP or LRP to meet the needs of the people who may be affected by the project.
Stakeholders	All individuals, groups, organisations, and institutions interested in and potentially affected by a project or having the ability to influence a project.
Vulnerable People	Distinct groups of people who might suffer disproportionately from resettlement effects. They may be households below poverty line or will become below poverty line as result of loss to assets and/or livelihoods, women headed households, the elderly or disabled.