PRESENTATION

Session: **Traceability**

Title: **Development of an Electronic Traceability System for Cotton products in the Supply Chain: From the field to the Textile Mill**

Speaker: **Rinat Gulyaev,** Cotton science-innovation Center, Bukhara, Uzbekistan

Presentations are available in the conference archive: https://baumwollboerse.de/en/competencies/international-cotton-conference/speeches/

Conference Organization

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– International cotton conference Bremen 2022–

DEVELOPMENT OF AN ELECTRONIC TRACEABILITY SYSTEM FOR COTTON PRODUCTS IN THE SUPPLY CHAIN: FROM THE FIELD TO THE TEXTILE MILL

R.A. Gulyaev – Director, Cotton science-innovation Center

Presented by

Ministry of innovative development of the Republic of Uzbekistan

Presented by

Cotton Science-Innovation Center

Presented by

Bukhara Agrocluster

– September 2022 –

Vision

1. **The textile and light industry of Uzbekistan expand the assortment and range of manufactured finished textile products. 100 % percent of cotton fiber and more than 45 % of yarn processed now locally. The volume of exports of textiles increased to 3.1 billion US dollars in 2021.**

2. **As one of the most important measures for increasing the export of Uzbek textile products, primarily to the markets of the European Union, the United States and other developed countries, is to ensure the transparency and traceability of the supply chain of textile products.**

3. **The EU has accepted the Republic of Uzbekistan as the 9th beneficiary country of the special incentive arrangement for sustainable development and good governance (GSP+) under the unilateral Generalized Scheme of Preferences (GSP). The EU will start applying preferential tariffs for products imported from Uzbekistan under this arrangement from 10 April 2021.**

Target parameters:
by 2025 it is planned to increase the production of textile, knitwear and garment products to 15 billion US dollars, and the volume of exports to 7 billion US dollars.

Cotton Value Chain

Example for a Cotton Value Chain

Seed
Cultivation
Harvest
Ginning
Transport
Spinning
Dyeing
Knitting
Assembly
Transport
Distribution
Transport
Sales
Consumer
Disposal
Post Consumption

Stage #1

Stage #2

Stage #3 (existed)

The traceability chain systems for finished textiles and garments are mainly supported by textile mills in partnership with retailers. However, this data chain lacks information on raw material suppliers, farmers, ginneries, fiber producers.

Vision

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

1

At the level of the cotton and textile industry in Uzbekistan, there is every opportunity to implement a traceability program. Identification and labeling standards can be applied by virtually everyone in the production chain. Thus, farms can trace the origin and parameters of the supplied sowing cotton seeds, ginneries have the ability to identify lots of seed cotton coming from farmers, and bales of cotton fiber and linters produced as a result of primary processing. Textile mills that process cotton products, manufactured textile products (yarn, fabrics, knitted fabrics, finished garments) are mostly labeled with barcode tags based on GS1 international standards, control (identification) signs with security elements, control (identification) signs based on RFID technology, and other methods.

2

The lack of conceptual integrity between the elements of this disparate system in the form of international standards for identification and labeling, a common data model, lack of semantic compatibility does not yet allow the implementation of an integrated technology for traceability of goods in the cotton and textile complex of Uzbekistan

3

Aim of the project - the development and integration of the functionality of the existing specialized systems in the cotton-textile complex of the Republic of Uzbekistan at the stage from sowing to the supply of cotton fiber to textile mills, which can subsequently be integrated into existing international traceability systems.

4

The project are aimed at informing consumers of finished textile products about the entire production chain of the purchased product, its origin, composition, quality parameters, compliance with social, environmental and labor standards, etc. At the same time, retailers, through the implementation of these programs, have the opportunity to reduce reputational risks by preventing the supply of products from countries / from suppliers where basic social and environmental requirements, labor standards, and environmental protection standards are not observed.

Cotton Value Chain: SEED

Block number 1. SEED
Information for each lot of sowing seeds:

- Variety
- Reproduction (Super elite, Elite, R1, R2, R3)
- Grade
- Class
- The type of seeds (seeds of traditional selection, genetically modified seeds, hybrids, etc.).
- Fuzziness of seeds (bare, slightly pubescent, pubescent)
- The chemicals used during the treatment (fungicides, insecticides, stimulants, etc.)
- The type of treatment (chemical or mechanical)
- Date of production
- Producer/Supplier of sowing seeds
- Seed buyer

Workshop for preparation of sowing seeds

Seed Warehouse

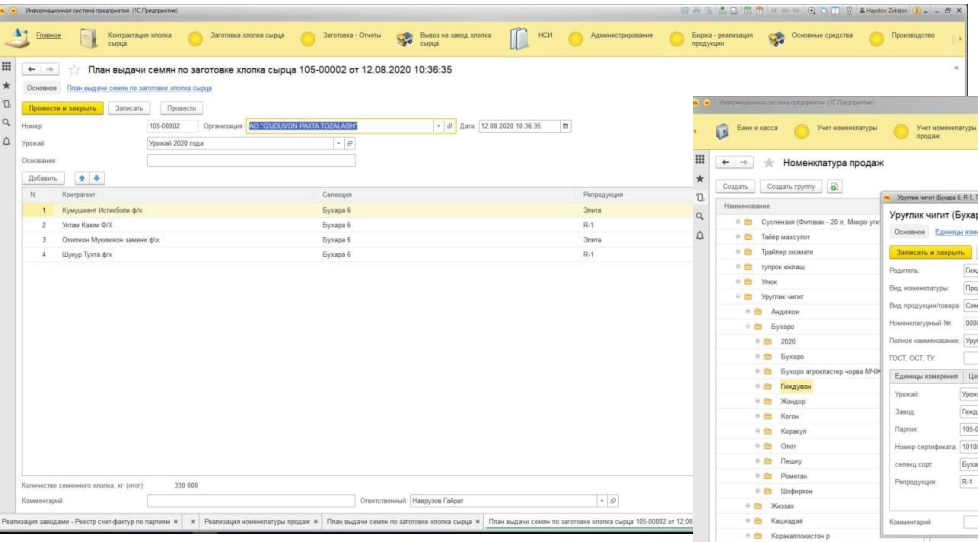
Farm

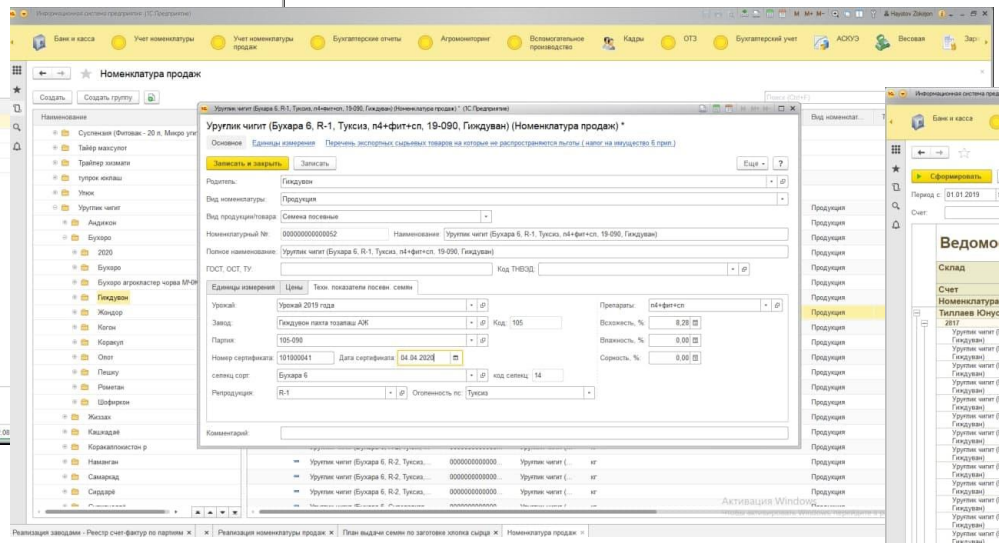
Seed

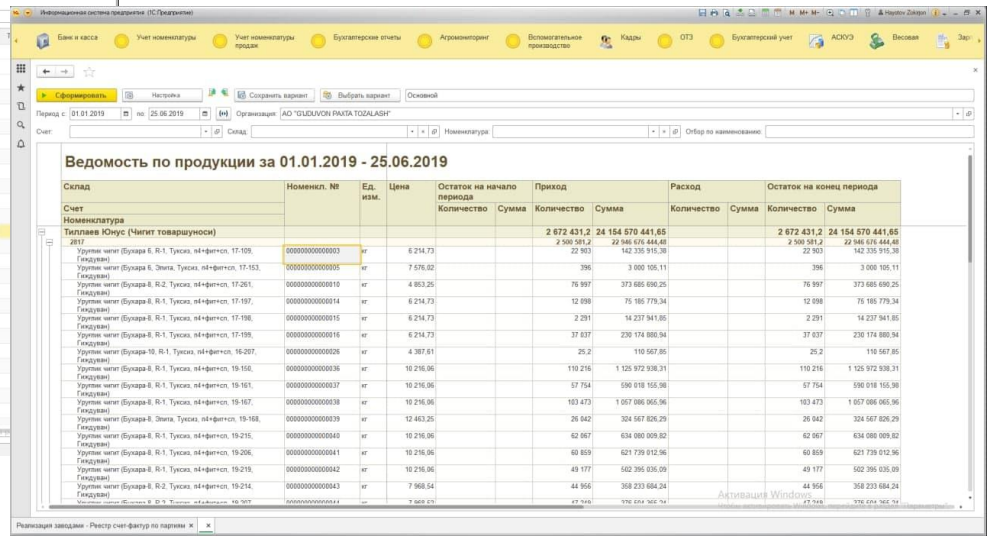
Cotton Value Chain: SEED

Available

«UZPAXTA-1C» Software Database (UZCOTTON – 1 C)







Necessary to create system

Bar code console

Bar code

Each bag of Seeds

Bar code reader

Database

Cotton Value Chain: Cultivation

Available

Block number 2. CULTIVATION
Information for each contour (field):

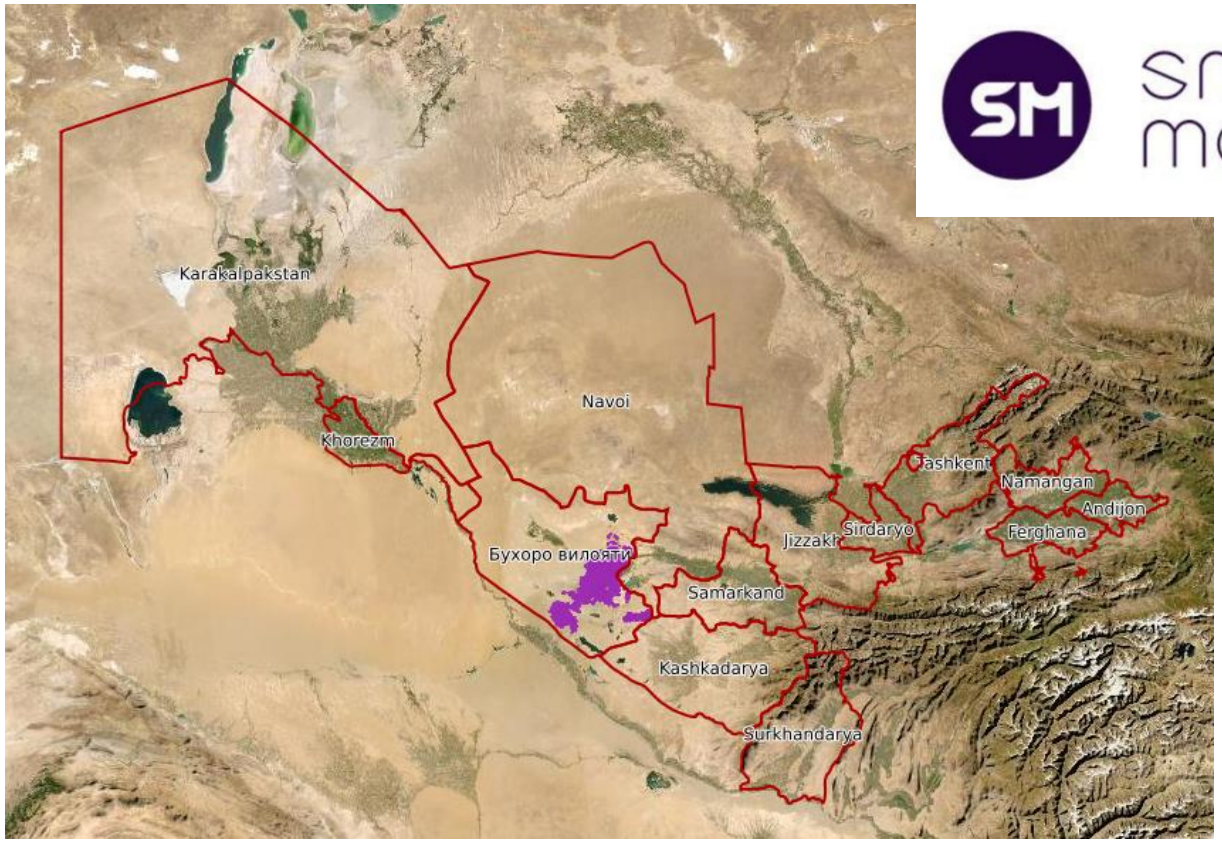
- Culture (cotton, wheat)
- Cotton or other crop development (NDVI index)
- The content of macro, mezo and microelements in the soil (phosphorus, nitrogen, potassium, boron, magnesium .....)
- Agrochemical maps
- Salinity maps
- Water maps (irrigation, drip irrigation, without irrigation)
- Water, Seed, Fuel, Fertilizer consumption
- Salary expense
- Agrotechnical measures (technological map)
- Yield

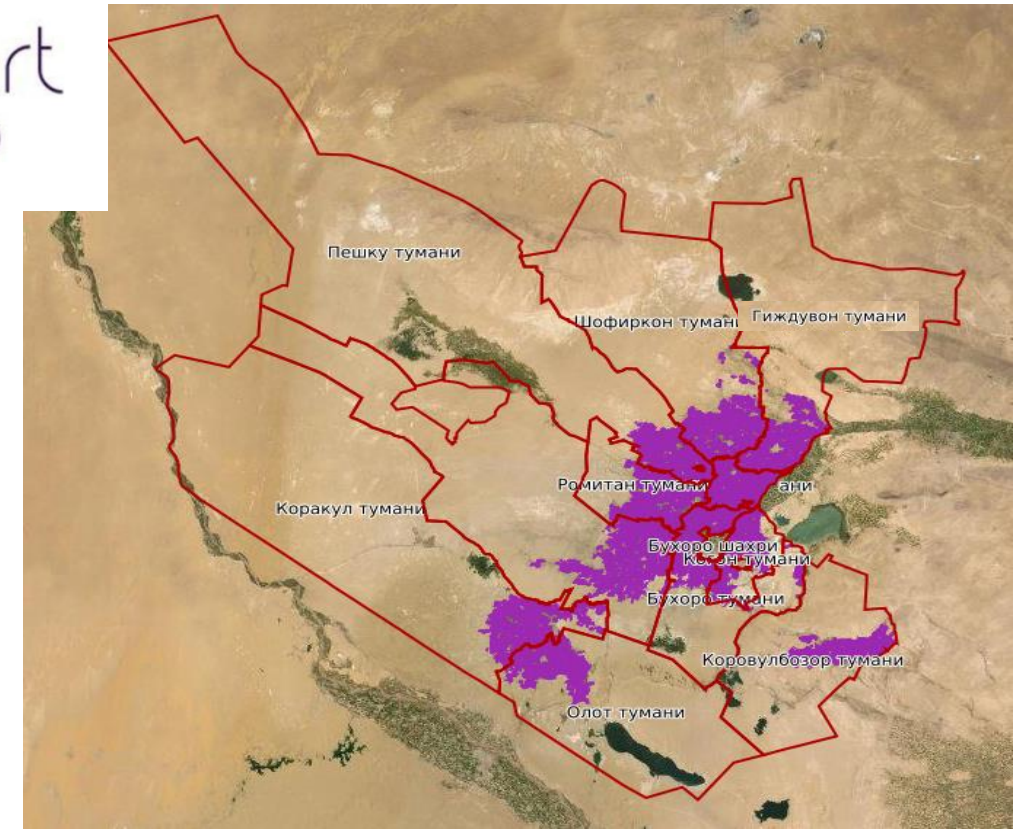
Cotton Value Chain: Cultivation

225 553 ha
Total area

Sowing area of Bukhara region

67 732 pc
Contours (Fields)





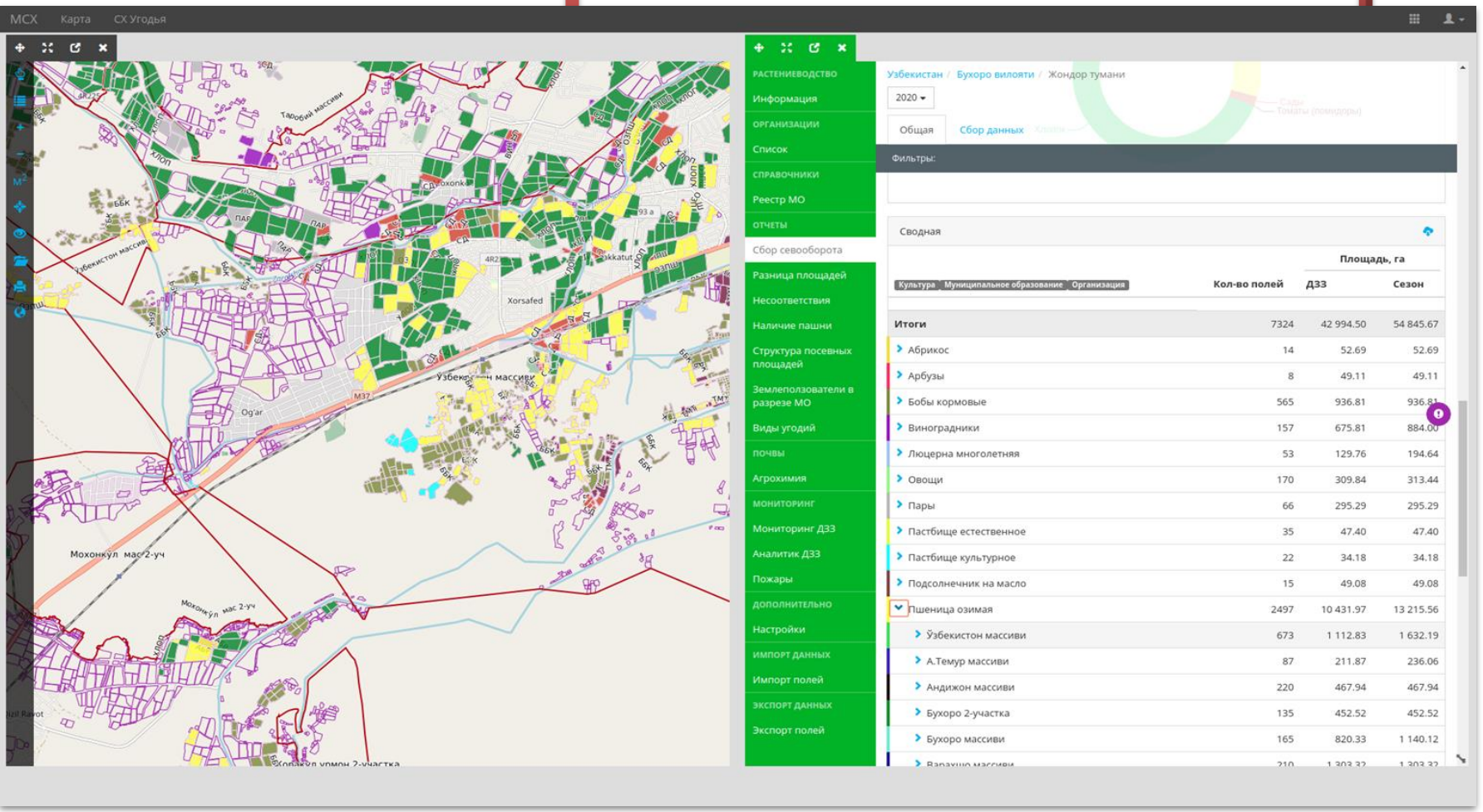
Cultivation

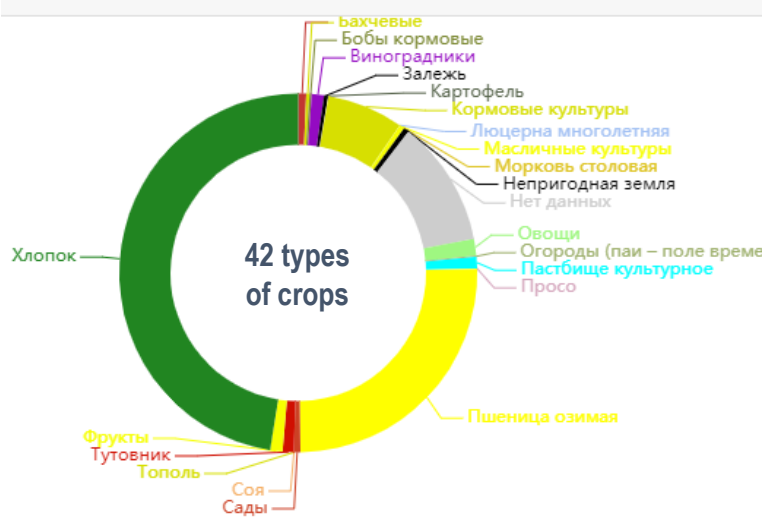
Cotton Value Chain: Cultivation

100 % Under control

97 900 ha Cotton

60 600 ha Wheat

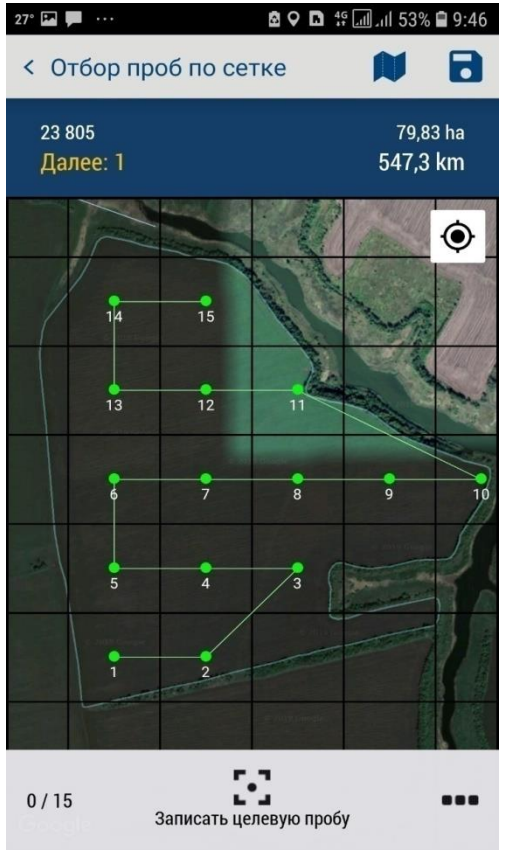




Variety placement maps by crop types have been formed, as a result of which detailed information about each contour and the previous and current condition of the crops are formed on multi-layered maps.

Cotton Value Chain: Cultivation

AGROCHEMICAL INSPECTION OF SOIL

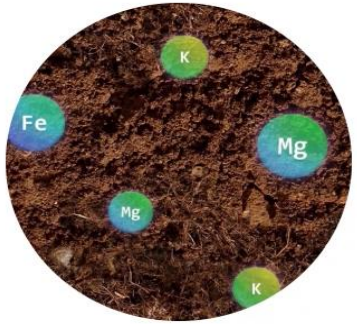


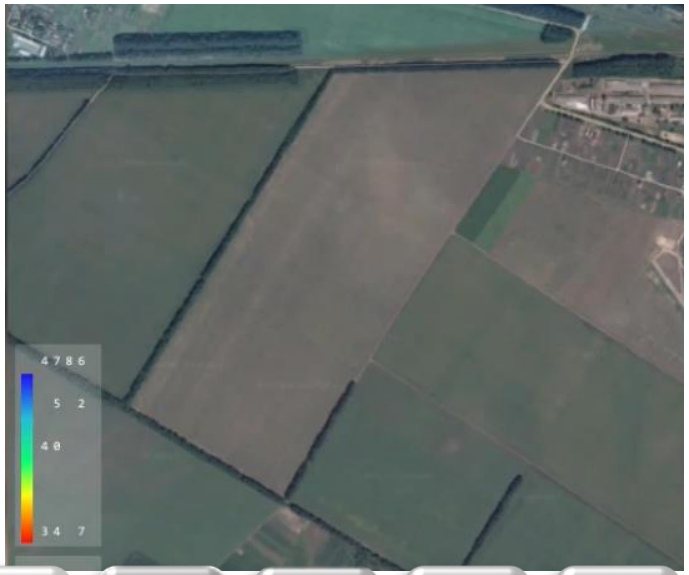
Determining soil sampling points in contours

Export the map to the mobile application for soil sampling

Creating input maps based on agrochemical tests

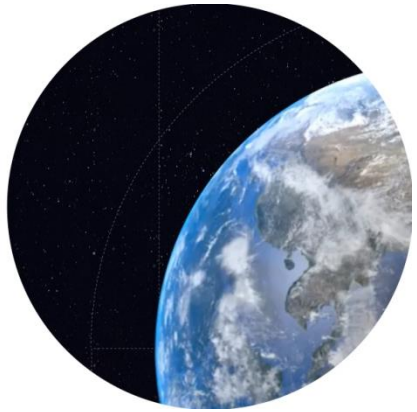
Module of agrochemical analysis - forms contour maps based on agrochemical analysis of soil and helps to determine the quality of contours





Cultivation

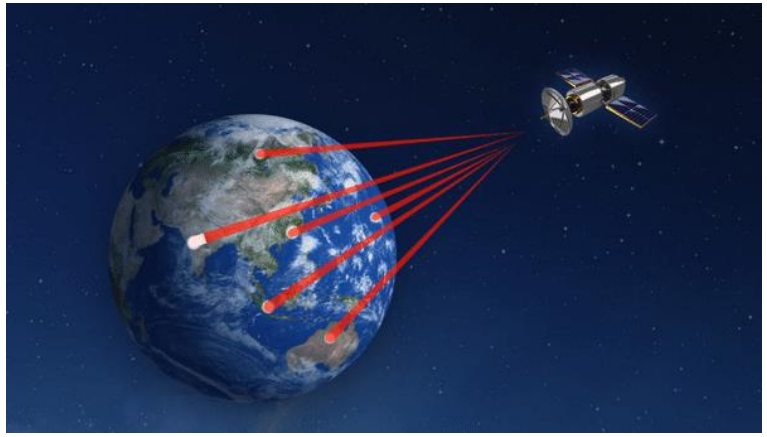
Cotton Value Chain: Cultivation

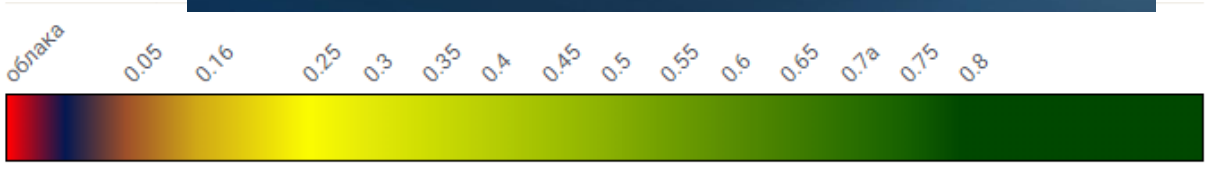


- Detection of changes in contours (Analysis of plant development by NDVI imaging with the help of Sentinel 2 Satellite)
- General and detailed information about each contour is obtained:
  - Contour size (ha)
  - Crop vegetation
- Zoning of contours, statistical analysis and comparison by zons
- Instructions for agrotechnics

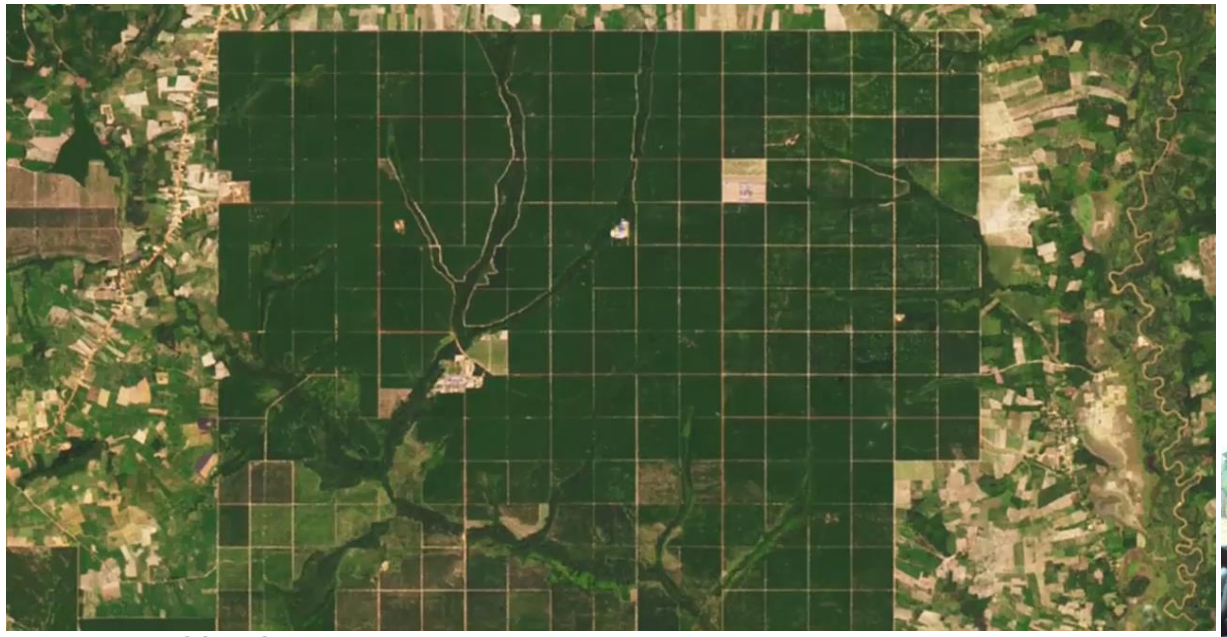
The program analyzes the biomass vegetative growth index using NDVI photographs taken from satellites and automatically colors based on a scale from 0 to 1.

FIELD MONITORING WITH SATELLITE





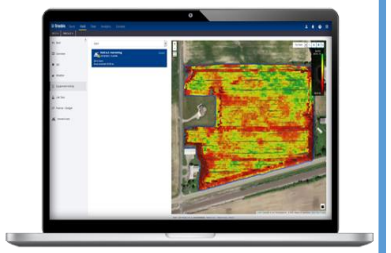
Cotton Value Chain: Cultivation



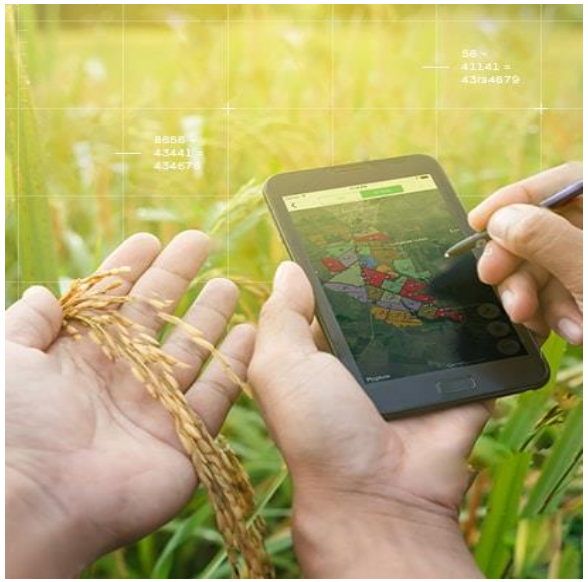
Cultivation

MONITORING SYSTEM

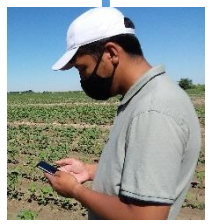
Analytic Center

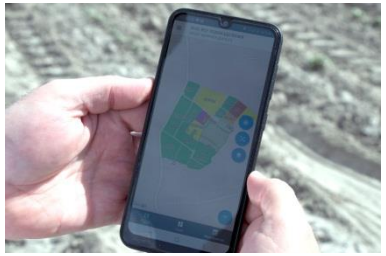


Operators



Agronomists





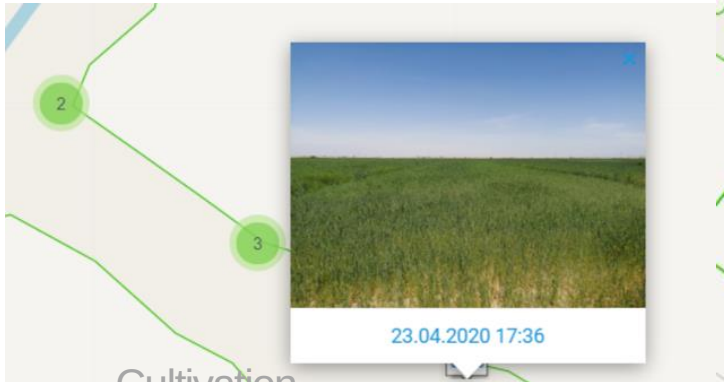
Cotton Value Chain: Cultivation

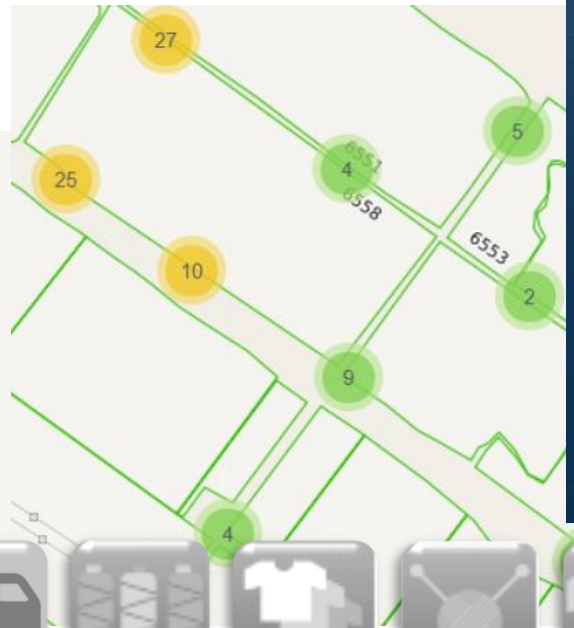
AGRO-SCOUTING REPORTS

The agro-scouting module collects information about the condition of the contours and crop development.

- Through mobile applications, agronomists take photos and identify problems identified by the results of the vegetative NDVI index.

- The system allows agronomists to measure and photograph the current state of the fields using mobile devices, and data and images are automatically entered into the system.





Cotton Value Chain: Cultivation

Monitoring of agrotechnical operations

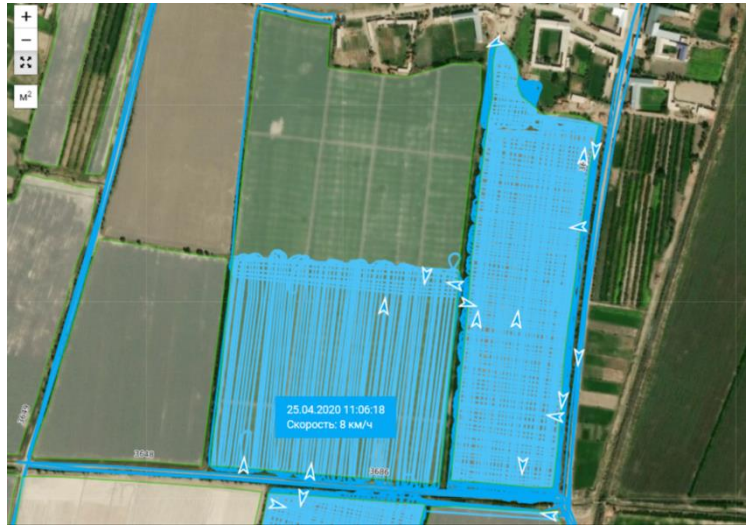
Equipment and transport control module - GPS increases the efficiency of equipment and saves fuel

Reflect the work of machinery in the field in a specific time mode

Automatic detection of equipment operations in the field

Control the speed mode of the machine
Calculation of area on the fields for each operation done

Calculation of consumption for 1 hectare: fuel, fertilizers, seeds, salary



Automatic refueling

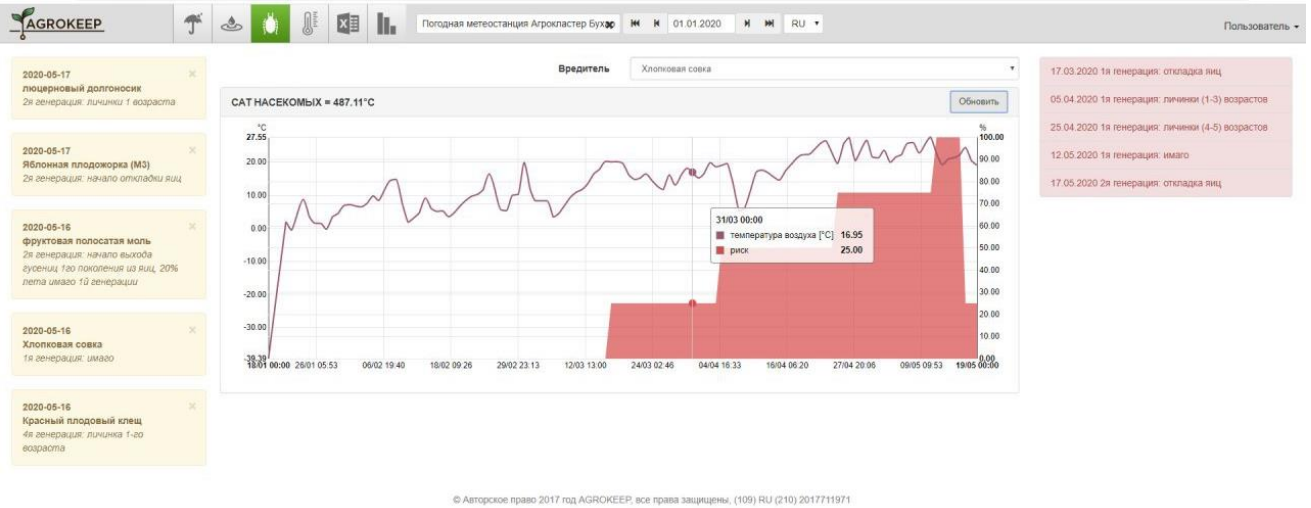
35 pc

Cultivation

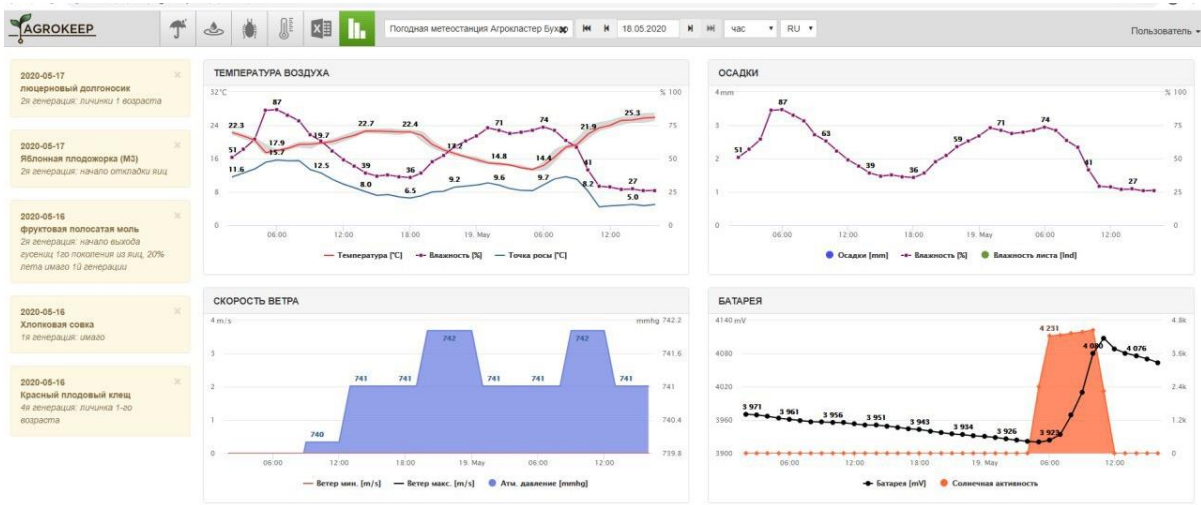
GPS systems

283 pc

Cotton Value Chain: Cultivation



Information from weather stations



Meteorological module - special weather tools calculate the probability of the development of diseases and pests to take timely preventive measures as a result of the formation of weather forecasts

Weather stations

12 pc

Cultivation

Predicting disease development based on software algorithms

Cotton Value Chain: Harvest & Procurement of seed cotton

Block number 3. Harvest and procurement of seed cotton
Information for each lot (truck) of seed cotton:

- Region
- Farmer
- Contour (field)
- Cotton picking type (manual, machine)
- Variety
- Grade (colour)
- Class (moisture and trash content)
- Reproduction
- Technical cotton or for sowing purposes
- Price

Harvest

Cotton Value Chain: Harvest & Procurement of seed cotton

Procurement center

5-ХЛ

2018 йил 27 сен 23:10

Пахта тозалаш корхонаси: АО "O'ZBEKISTON PAXTA TOZALASH"(Toshkent)

Пахта тайёрлаш пункти: Жума-Бозор ПТМ

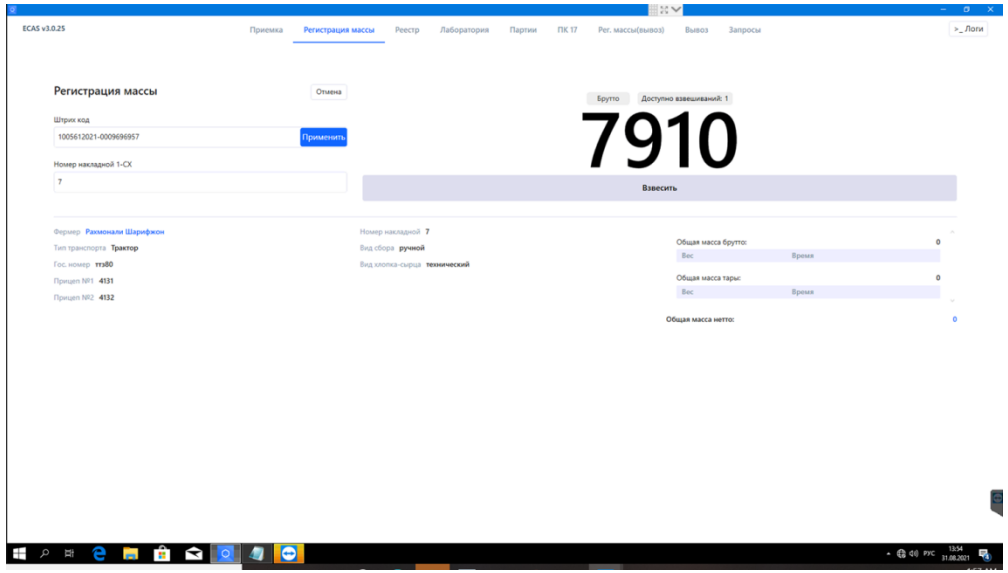
003162018-8589143614

№ 2 рақамли юк хати учун

Фермер хўжалиги: "ILG`OR HOSIL" ФХ

Транспорт тури: трактор, рақами: 1234

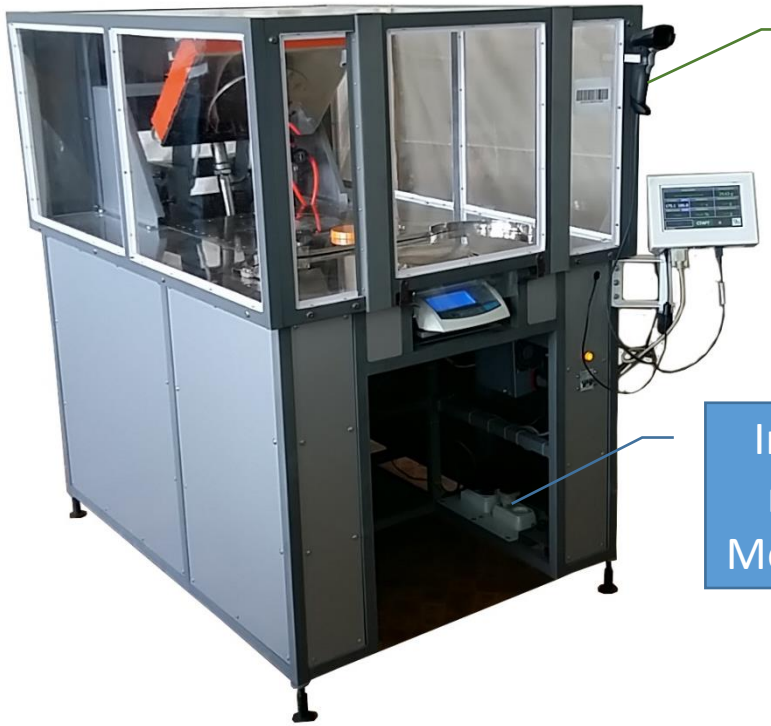
Прицеп сони: 1 ракам(лар)и: (1234)



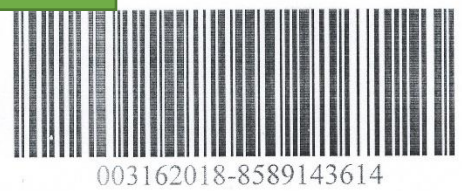
Upon arrival of the vehicle carrying the cotton, the operator reads the farmer's ID card. The software loads the required indicators from the directory. The operator enters information on the type of transport, number of trucks. The balances – indicate the weight of seed cotton (netto).

Harvest

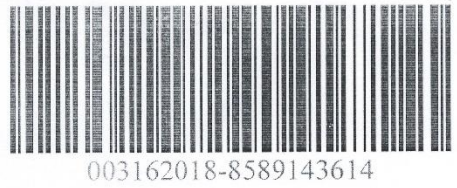
Cotton Value Chain: Harvest & Procurement of seed cotton



Bar code scaner



Instrument for measuring of Moisture content



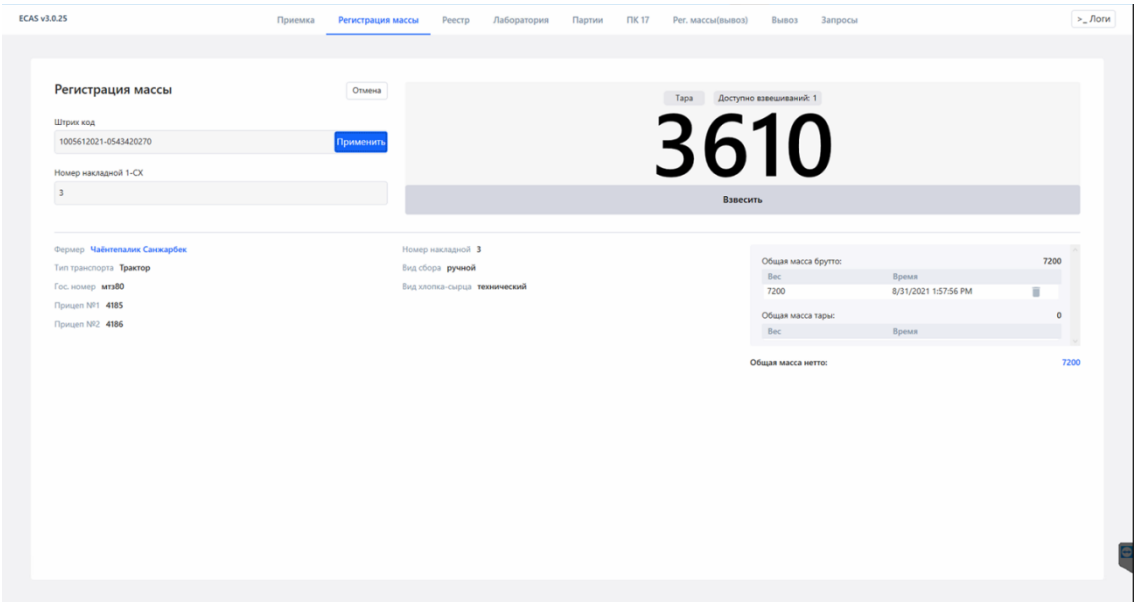
The laboratory scans a 2XL barcode submitted to the laboratory along with the seed cotton samples. The software of the automated instruments transmits the results to the database.

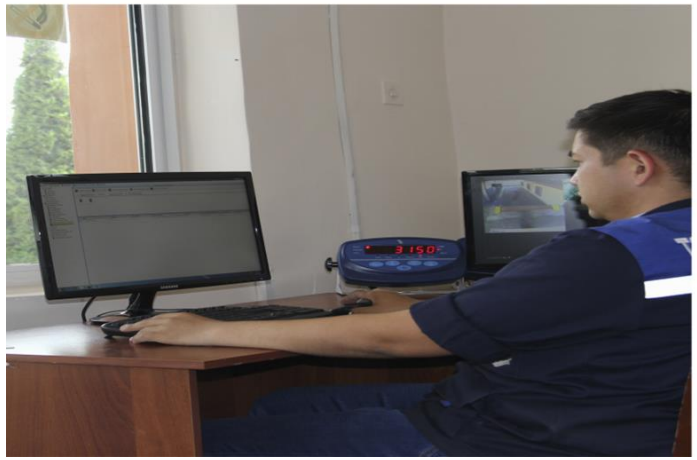
Laboratory analyzes

Instrument for measuring of Trash content

Harvest

Cotton Value Chain: Harvest & Procurement of seed cotton





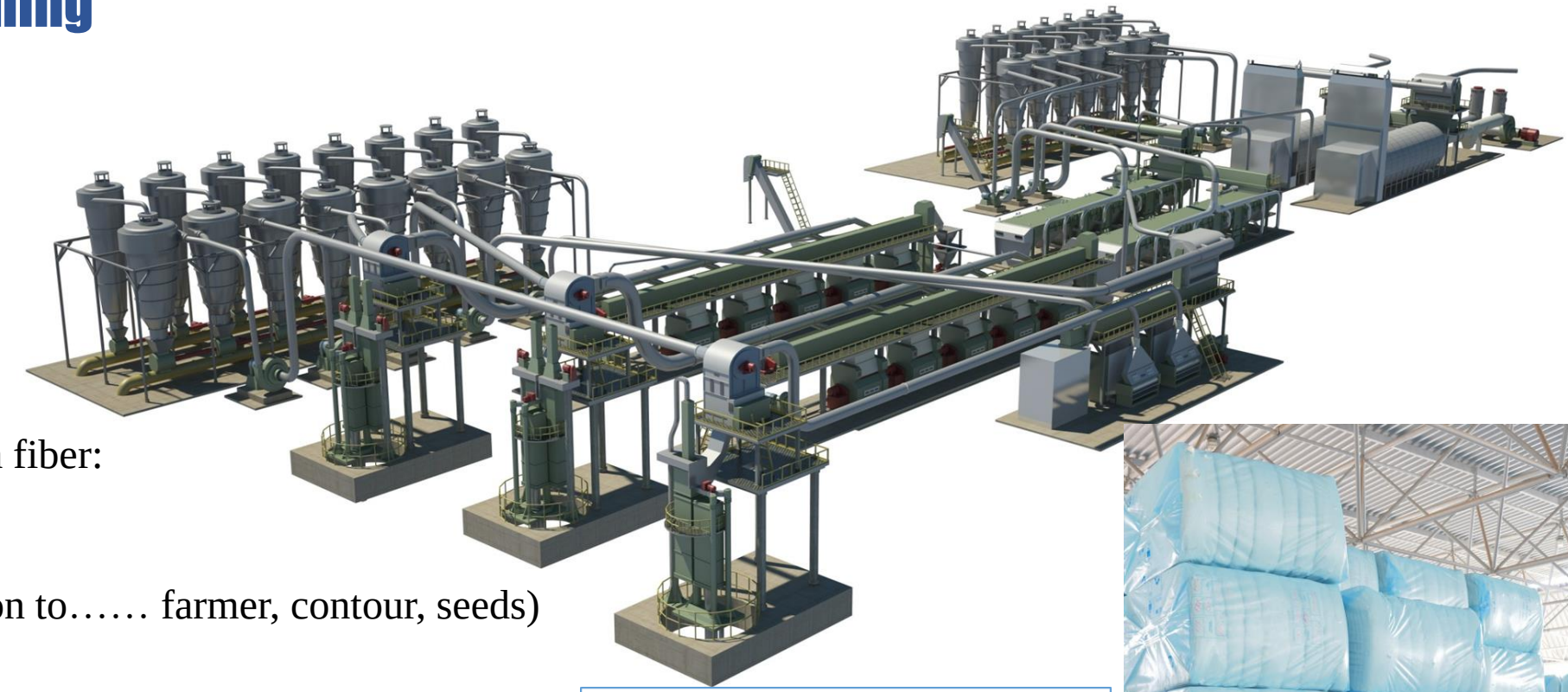
The transport is weighed a second time after seed cotton has been unloaded (tara). The operator scan barcode 1 SX and 5 XL forms signed by the classifier. The camera fixes the trolley number on the scales and compares them with the numbers on the 5-XL Permit. If the data on the numbers match, the data on the scales is stored in the software, the cameras fix the time the weight is measured, and the photograph is stored in the directory with a process barcode. Data on Tara, Netto, Brutto, Conditioned masses, quality indicators are recorded in the database.

Cotton Value Chain: Harvest & Procurement of seed cotton

Monitoring

Harvest

Cotton Value Chain: Ginning



Block number 4. Ginning

Information for each bale cotton fiber:

- Region
- Ginnery
- Lot of seed cotton (connection to…… farmer, contour, seeds)
- Variety
- Grade (colour)
- Class (trash content)
- Weight (netto, tara, brutto)
- HVI indicators
- Price

Ginning

Cotton Value Chain: Ginning





Ginning

Cotton Value Chain: Ginning

Scales for seed cotton

Electronic scales (balances)

Installation of bunker electronic scales for weighing of seed cotton, cotton seeds.
Obtaining online information about the volume of seed cotton provided to the process, produced seeds.
Automatic transfer to the Databases.

Scales for cotton seeds

Ginning

Cotton Value Chain: Ginning

Packing of cotton lint

Ginning

Cotton Value Chain: Ginning

Permanent Bale Identification

Consoles of PBI system at ginneries

The console function is to print barcode tags with information about the bale number, weight and date of production.

The system provides identification and accounting of each bale produced in the ginnery, which is traceable from the cotton gin to the textile mill.

The tag number consists of a 2-digit region code, a 3-digit gin code and a 7-digit bale number (permanent).

Barcode: Code 128 subset C

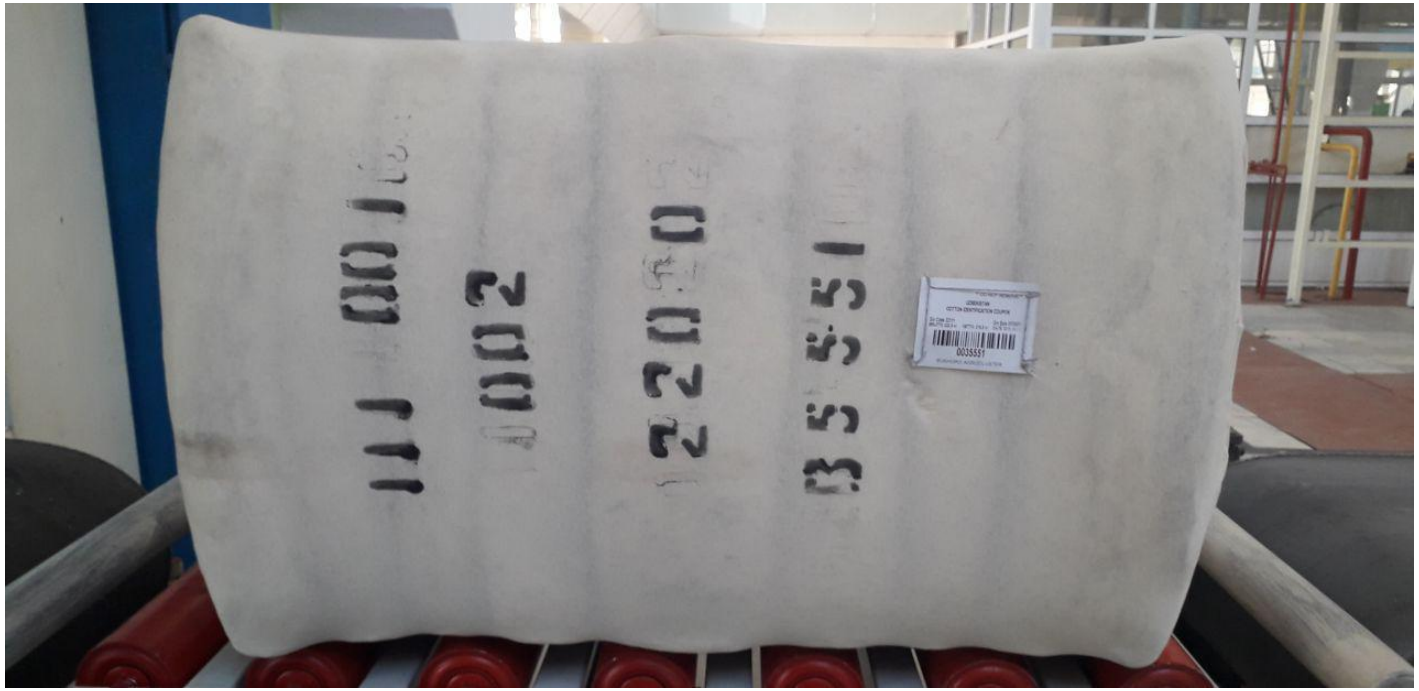
5 year cycle provided

Cotton Value Chain: Ginning

Permanent Bale Identification

Available

- Attached to each bale
- Attached to each sample selected for certification



Ginning

Cotton Value Chain: Ginning

CSITC (HVI) Quality Indicators for each Bale

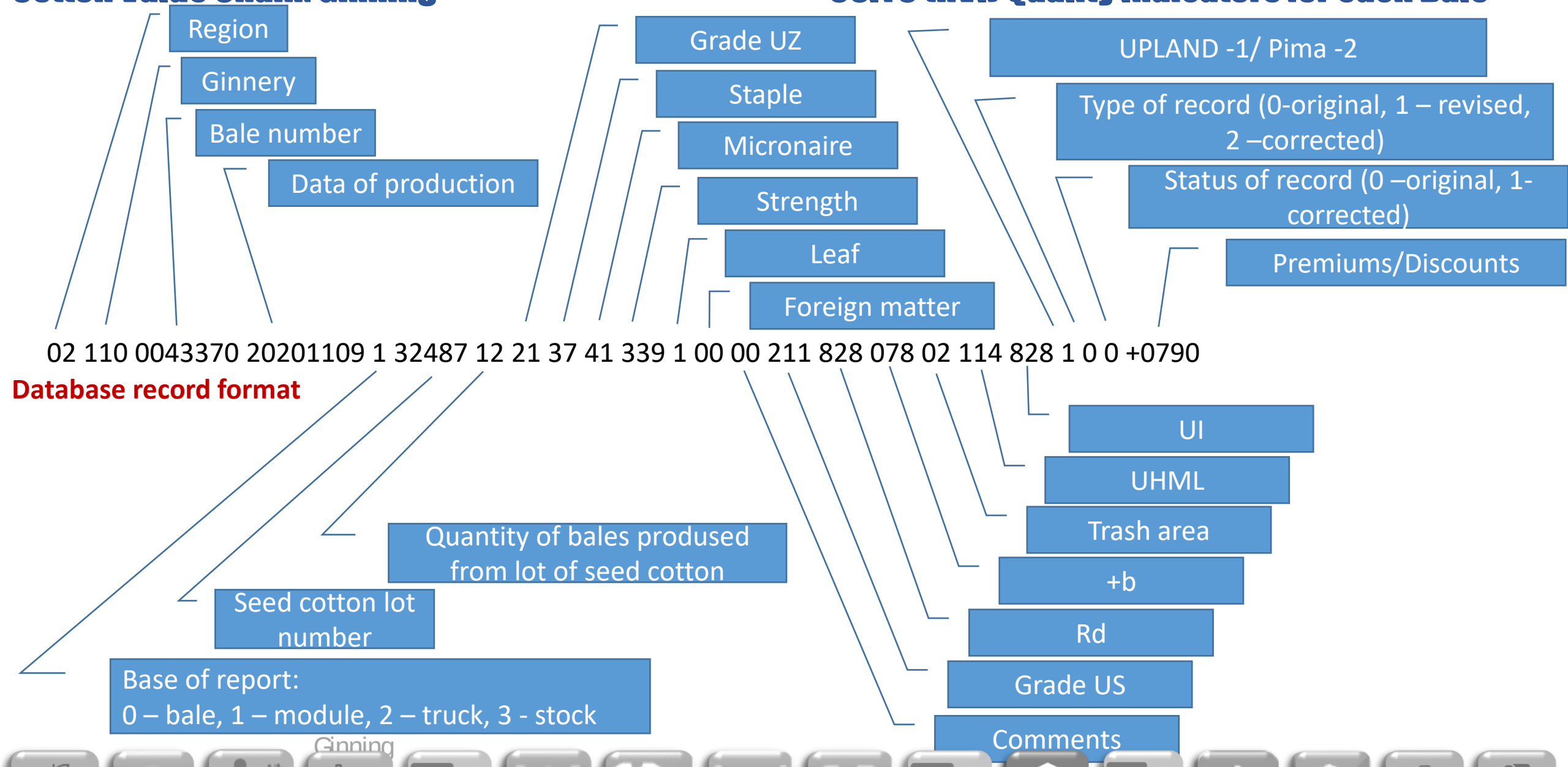
Available

- 100 % • Controls the quality and weight of each bale
- 100 % • 100% bale-by-bale certification since 2001
- 100 % • Database of all lots and varieties of cotton fiber

Ginning

Cotton Value Chain: Ginning

CSITC (HVI) Quality Indicators for each Bale

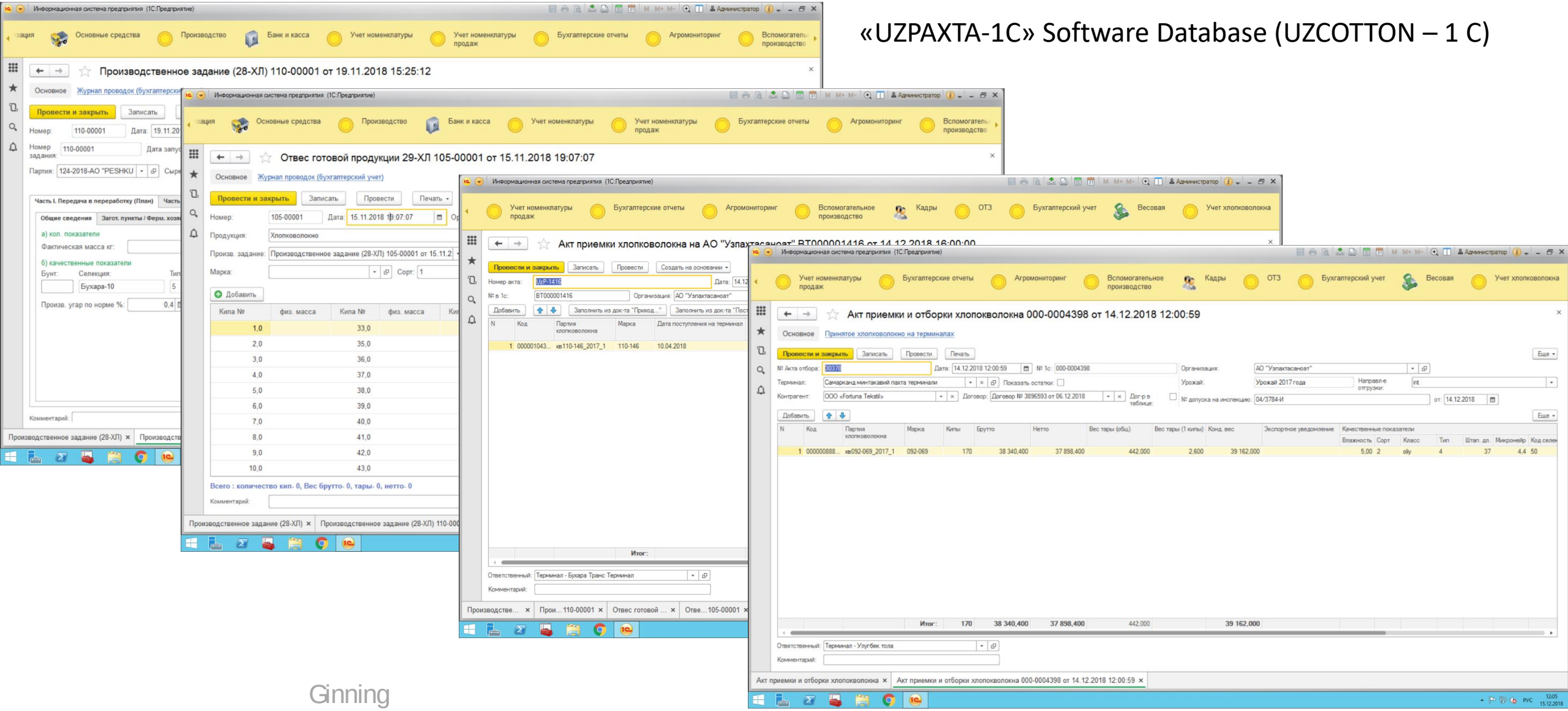


Cotton Value Chain: Ginning

Available

Accounting of production

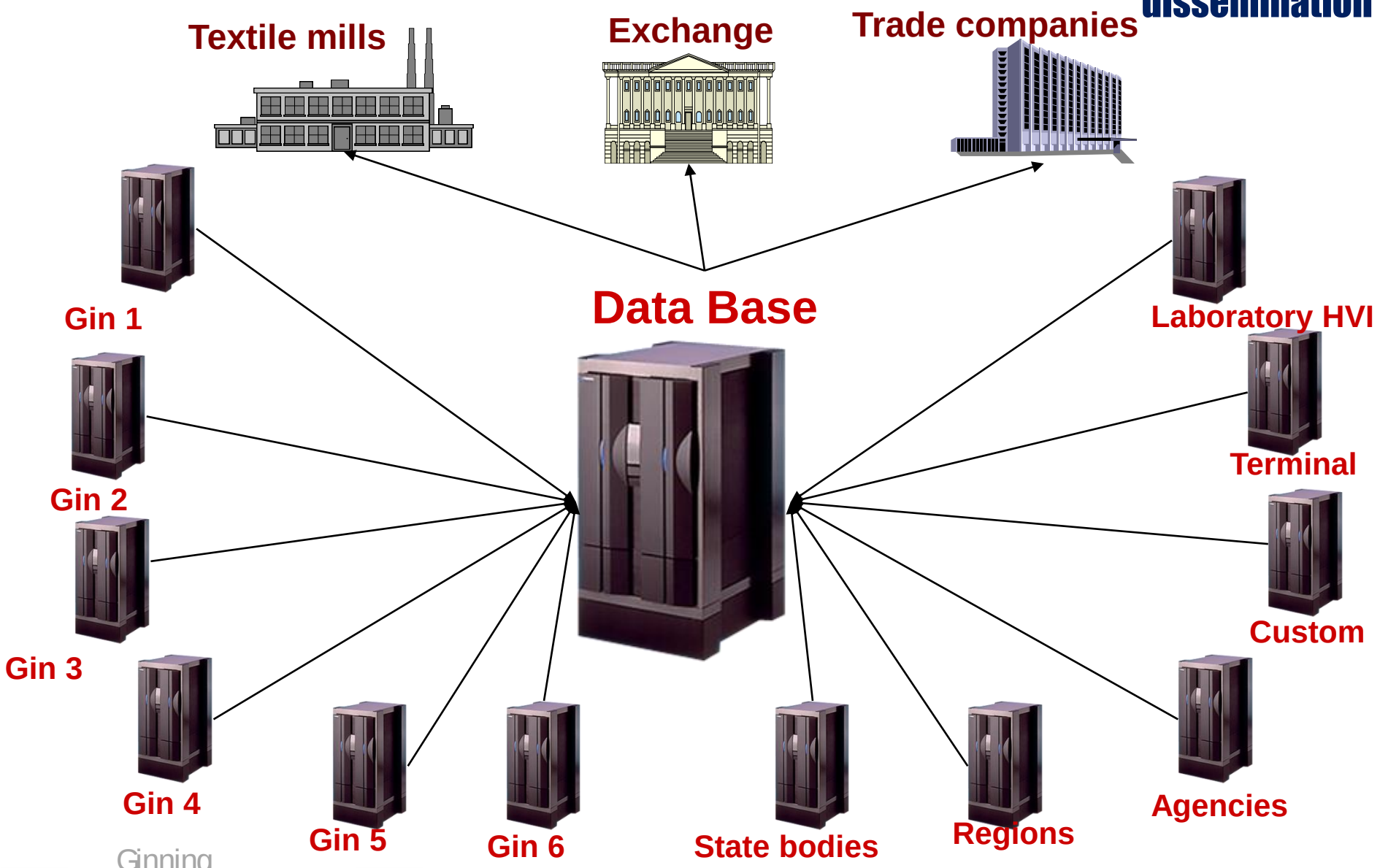
«UZPAXTA-1C» Software Database (UZCOTTON – 1 C)



Ginning

Cotton Value Chain: Ginning

Collection, processing and dissemination of data

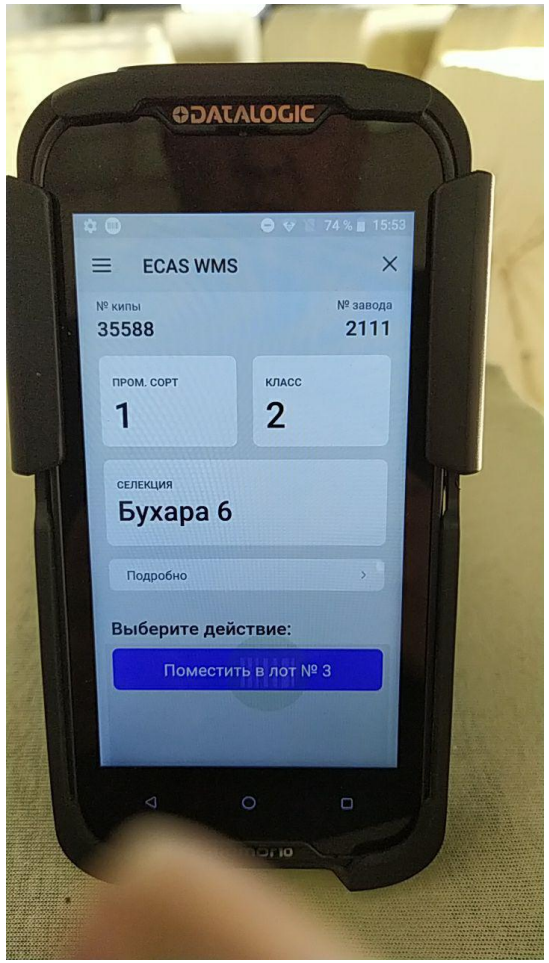


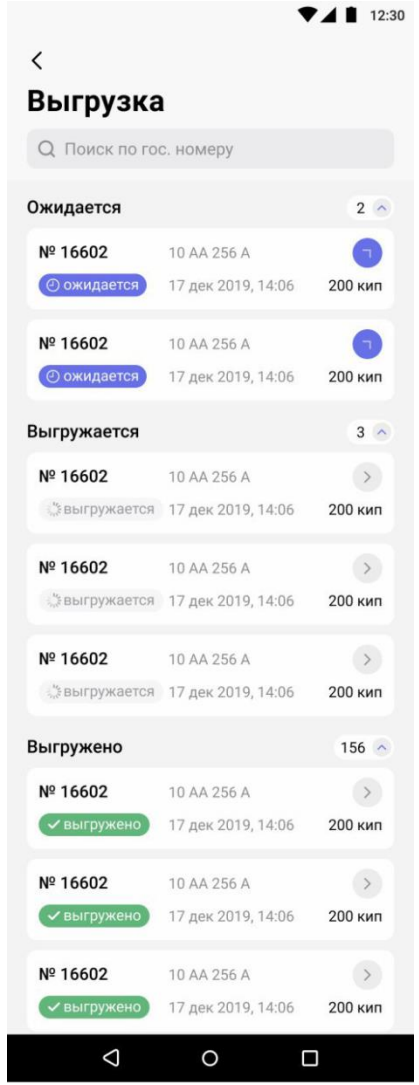
Ginning

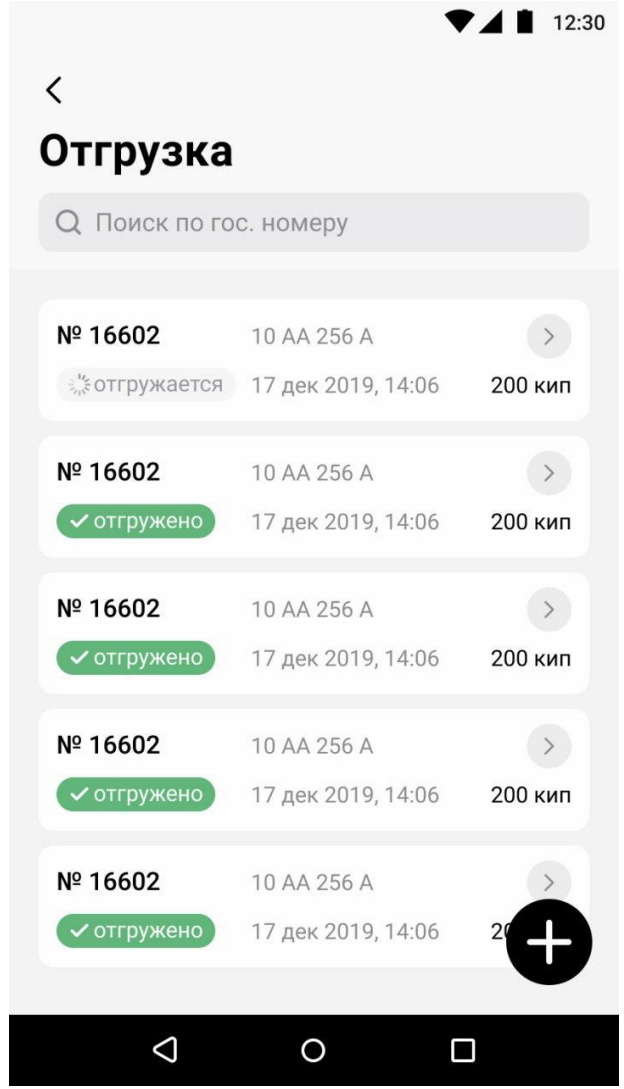
Cotton Value Chain: Ginning

Separation of bales to uniform lots (Grade/class)

Available







Ginning

Cotton Value Chain

PLANS FOR FUTURE (TEXTILE MILL)

Example for a Cotton Value Chain

Seed
Cultivation
Harvest
Ginning
Transport
Spinning
Dyeing
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Consumer
Disposal
Post Consumption

Stage #1

Stage #2

Stage #3 (existed)

Cotton Value Chain

Amir Textile

TEXTILE MILL

TEXTILE COMPLEX

КОМПЛЕКС ПАСПОРТИ

Placement	Bukhara region, Vobkent
Project initiator	Bukhara Agroklaster
Project period	2 quarter 2021 – 4 quarter 2023
New jobs	7 000 киши (охирги босқичда)

The total amount of planned investments

mln. Euro

156,2 | **99,6**

1 stage: Spinning

ЛОЙИҲА НАТИЖАЛАРИ

Cotton lint	40,995 tn
Technology	Advanced technological equipment imported from Europe and Japan
Export	200 mln Euro, 75% Export, 25% Local market
Profit	30,5 mln. Euro per year
Payback period	5 years
Consulting	“Gherzi" (Swiss) international consulting company

Cotton yarn **36 205** tn

Knitted fabric **15 985** tn

Yarn Dyeing **10 324** tn

Tights **1,970** mln. pc

Fabric dyeing **21 828** tn

Garments **6,916** mln. pc

Amir Textile project envisages creation of technological chain for production of high value-added products "From cotton fiber to finished goods"

Area **58** ha

Construction area **157 700** m2

Cotton lint → **10x** → Modern garments

GHERZI

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COMMERZBANK

AGROBANK

Thank you for attention

Ministry of innovative development of the Republic of Uzbekistan

Cotton Science-Innovation Center

Bukhara Agrocluster