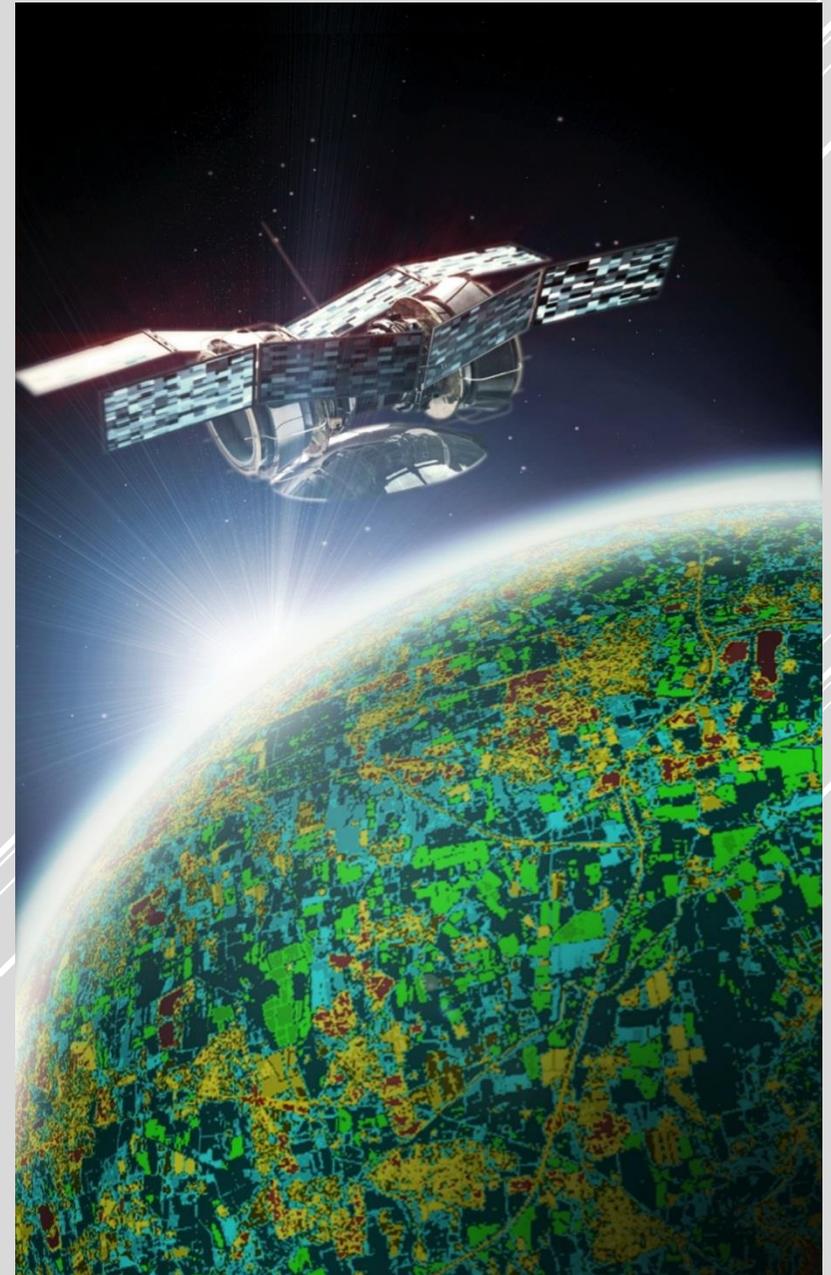


*Presented at the FIG Working Week 2020,  
10-14 May 2020 in Amsterdam, the Netherlands*



The Republic of Azerbaijan  
The State Committee on Property Issues

# LAND COVER MONITORING SYSTEM





# ADVANTAGES OF LAND COVER MONITORING SYSTEM

**Obtaining satellite images of the territory of Azerbaijan every 5 days**

**Monitoring of changes on the land cover as a result of comparing of satellite images and classification maps generated manually and automatically**

**Images of the land cover in infrared short waves, normalized water difference index, normalized flora difference index, etc.**

**Discovery of new installations and their locations (coordinates)**

**Automatic generating of flora classification map of the country**

**Generating of report (in tables and graphics) on annual and quarterly changes**



# ADVANTAGES OF LAND COVER MONITORING SYSTEM

**Monitoring of crops planted in agricultural land**

**Discovery of forest fires and monitoring of damages to the nature during emergency cases**

**Discovery of changes in forest areas**

**Discovery of changes in water volume in rivers and reservoir storages**

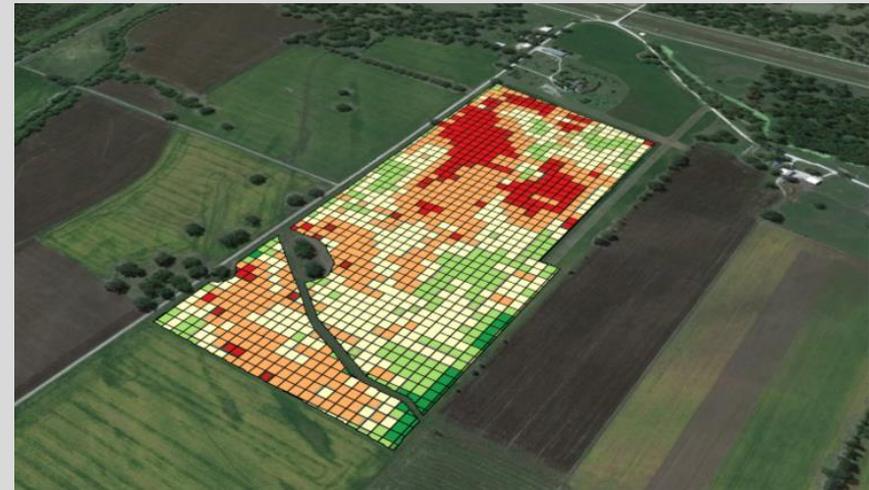
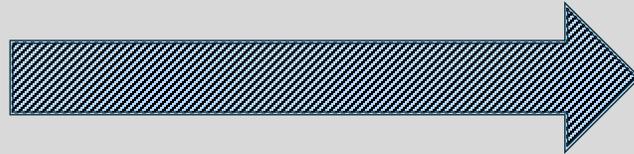
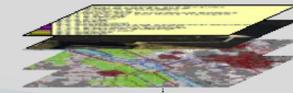
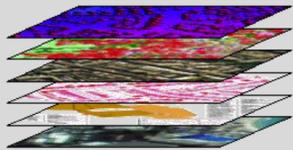
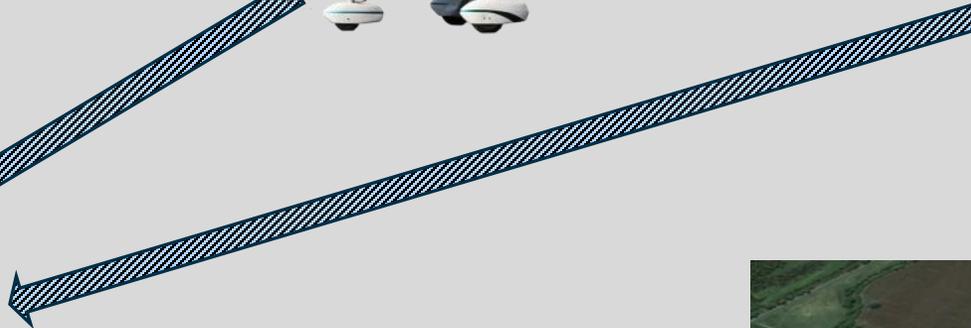
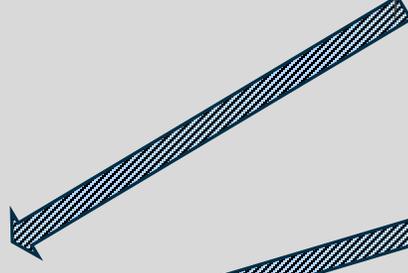
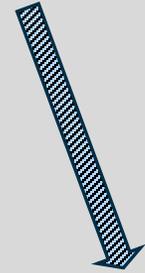
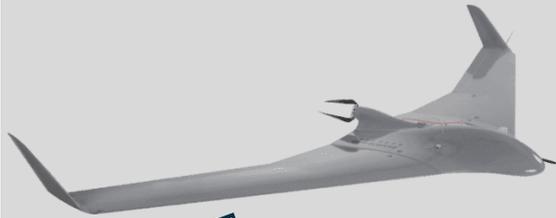
**State control on land use**

**Advantages for central and local power authorities to monitor areas**



# TECHNICAL ADVANTAGES OF LAND COVER MONITORING SYSTEM

Automatic processing of images taken with different equipment and applying the, in other GIS systems

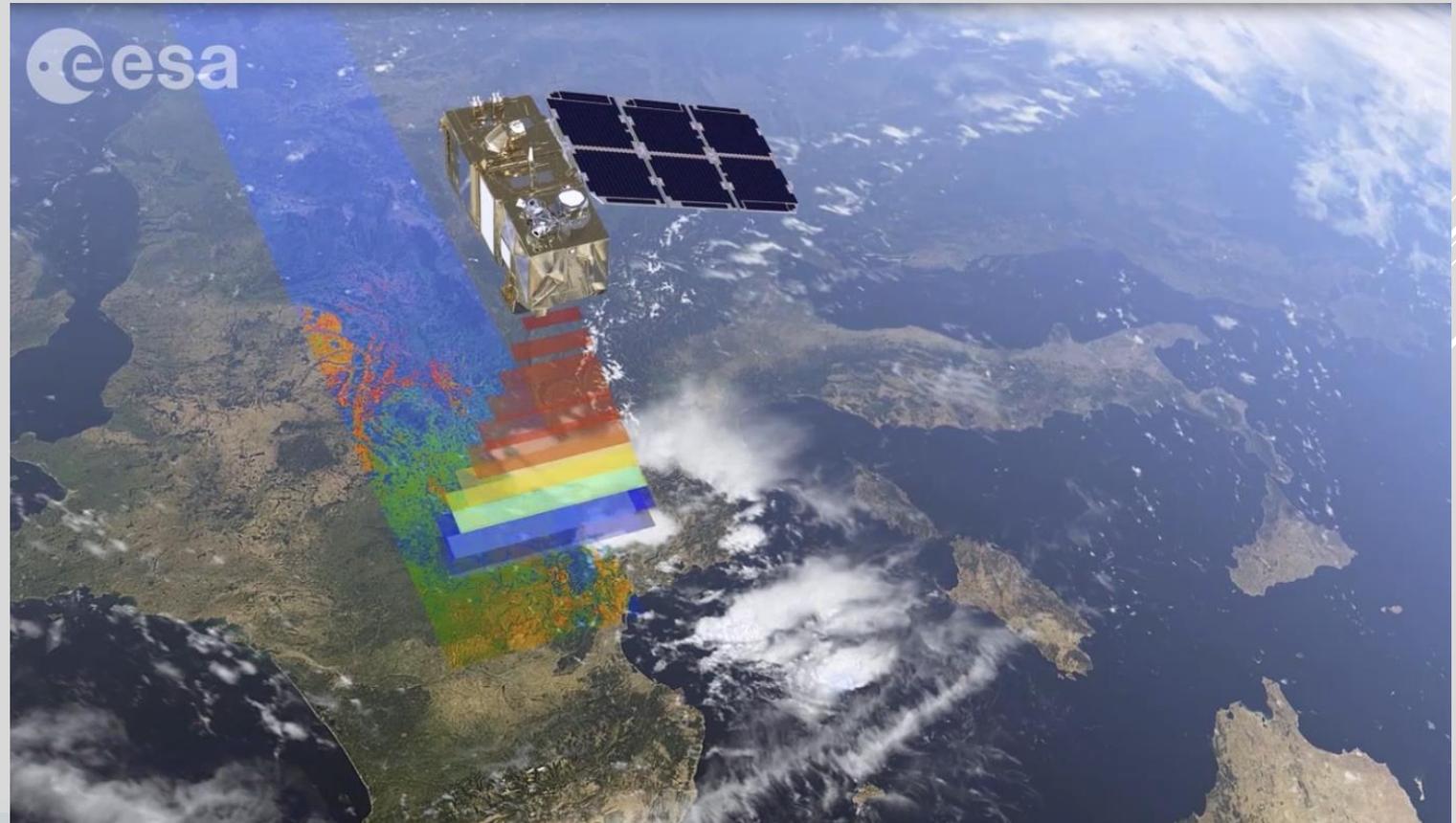




## DATA SUBMITTED TO LAND COVER MONITORING SYSTEM

Images from Sentinel – 2, **Landsat** and “Azersky” satellite of Azerbaijan

Humans often change their land plots, erect new installations, soil is polluted, agricultural land becomes construction areas, forests are destroyed and so on. This is why it is necessary to monitor all these processes to discover potential problems and illegal cases.

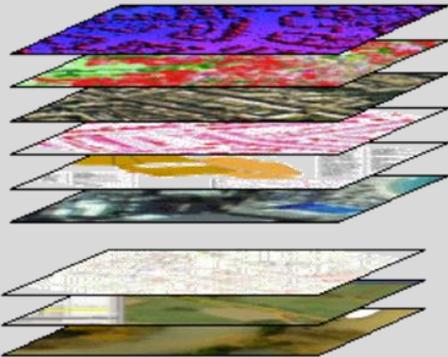




# OBSERVATION PLATFORM OF LAND COVER MONITORING

## DARA SOURCES

Azersky, Sentinel-1, Sentinel-2, Landsat images

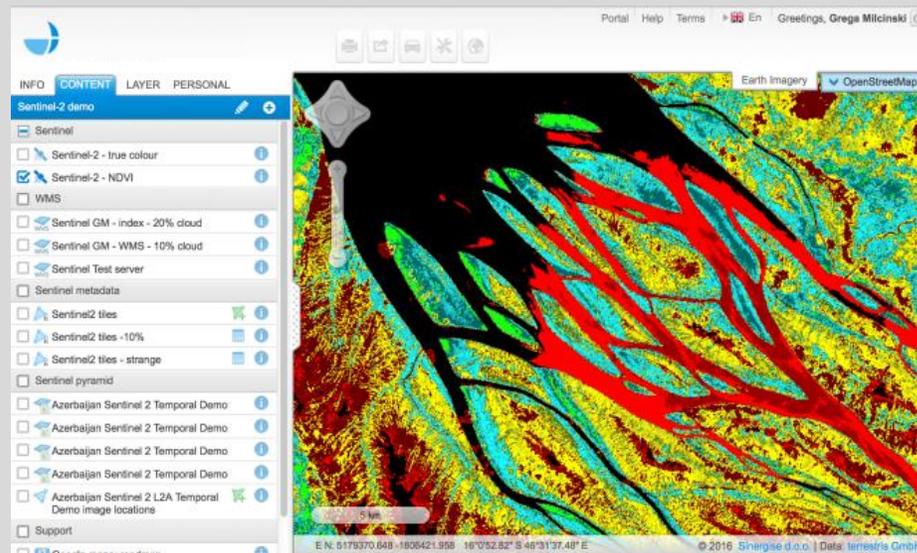


Aircraft orthophoto images



UAV images

## AUTOMATIC PROCESS OF DATA AND DELIVERING OF RESULTS



## USERS

State Committee on Property Issues

Ministry of Agriculture

Ministry of Ecology and Natural Resources

Ministry of Emergency

State Committee on Urbanization and Architecture

State Tourism Agency

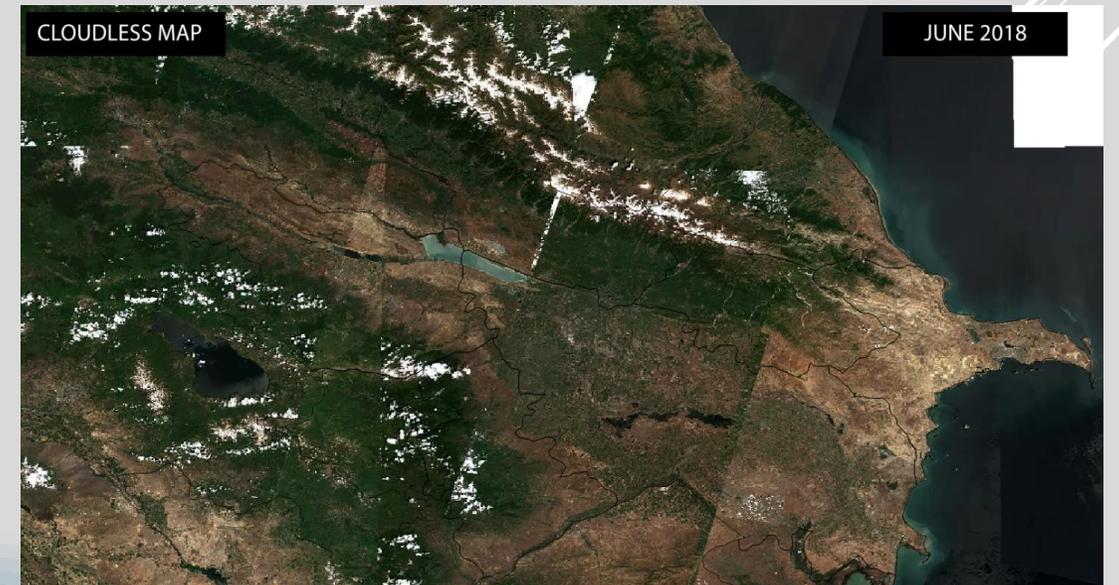
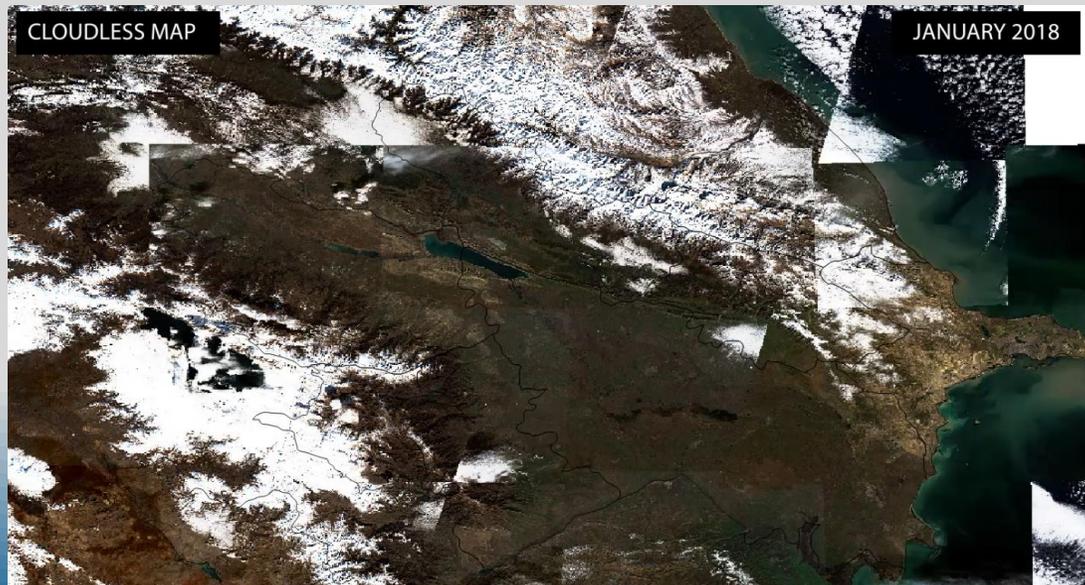
Local Power Authorities

Municipalities

Etc.



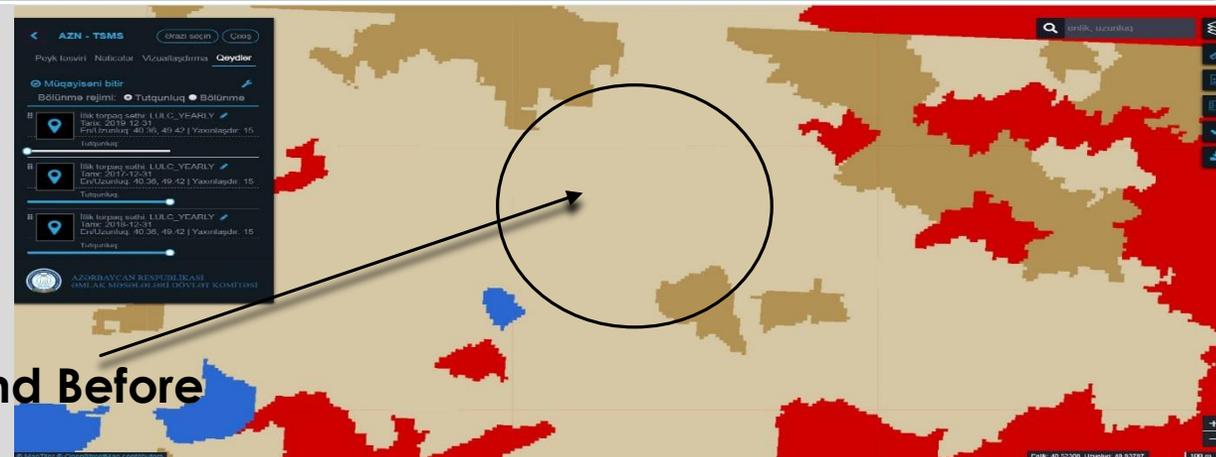
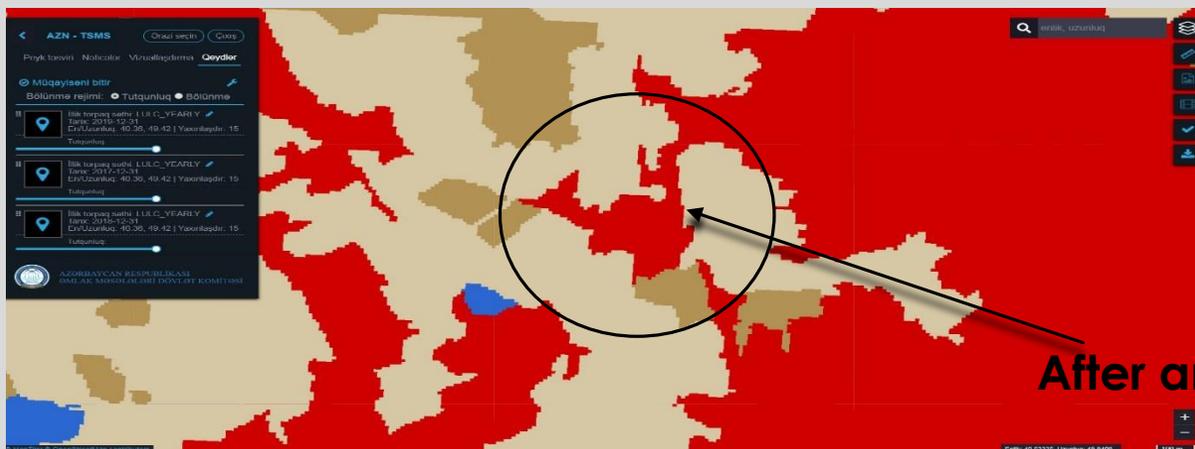
# SATELLITE SHOOTING IN DIFFERENT MONTHS





# DISCOVERY OF NEW INSTALLATIONS (BAKU)

## Automatic discovery of new installations and construction areas



After and Before

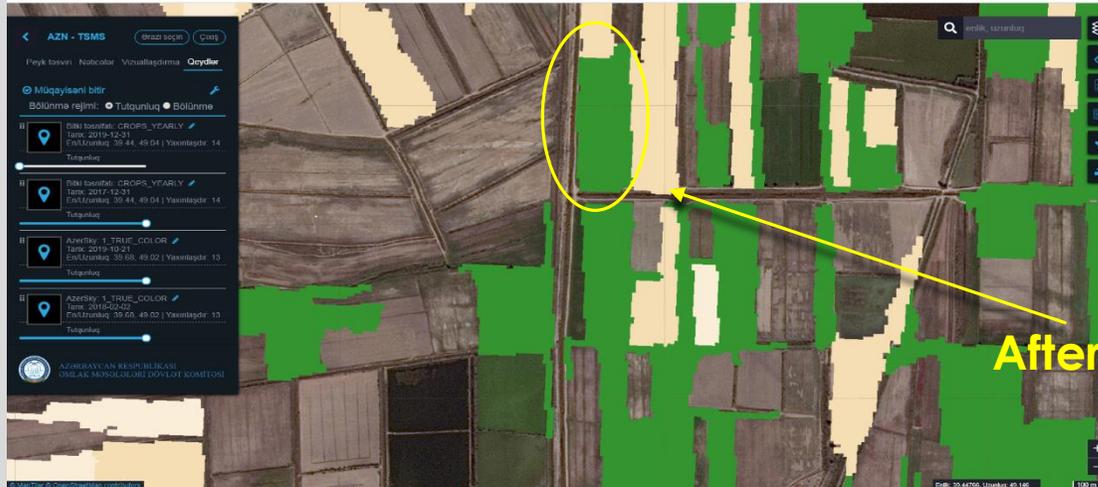


Real images  
after and before



# CHANGES IN PLANTED AREAS (AGHJABADI DISTRICT)

## Automatic discovery



After and Before



Real image After and Before



# CHANGES ON LAND COVER

Discovery of new installations and any changes on land cover



**ARTIFICIAL  
IRREGATED  
PLANTED AREA**



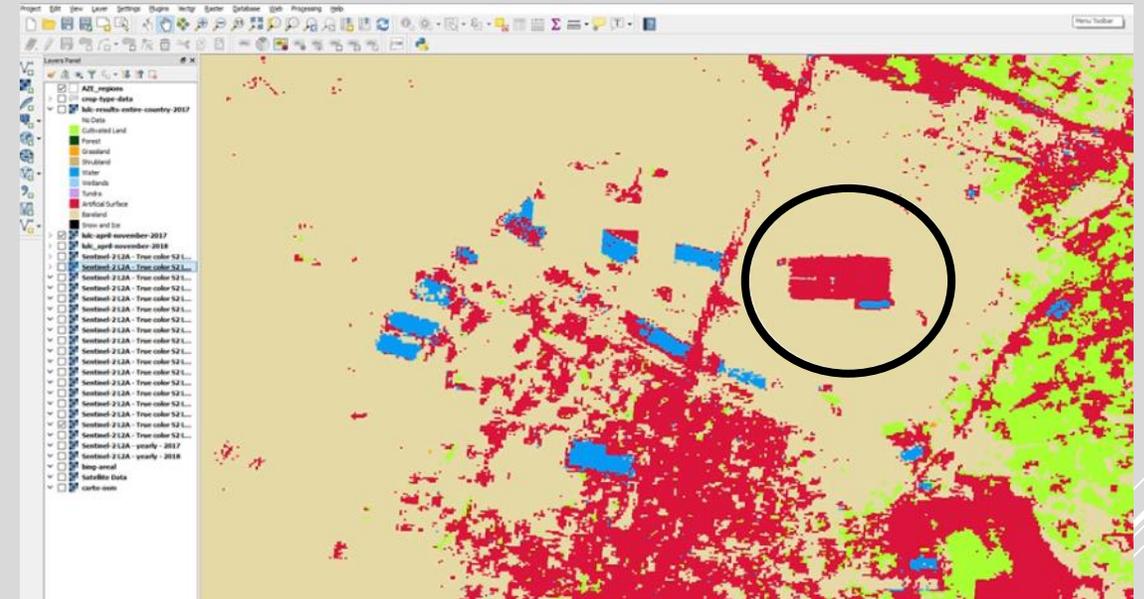
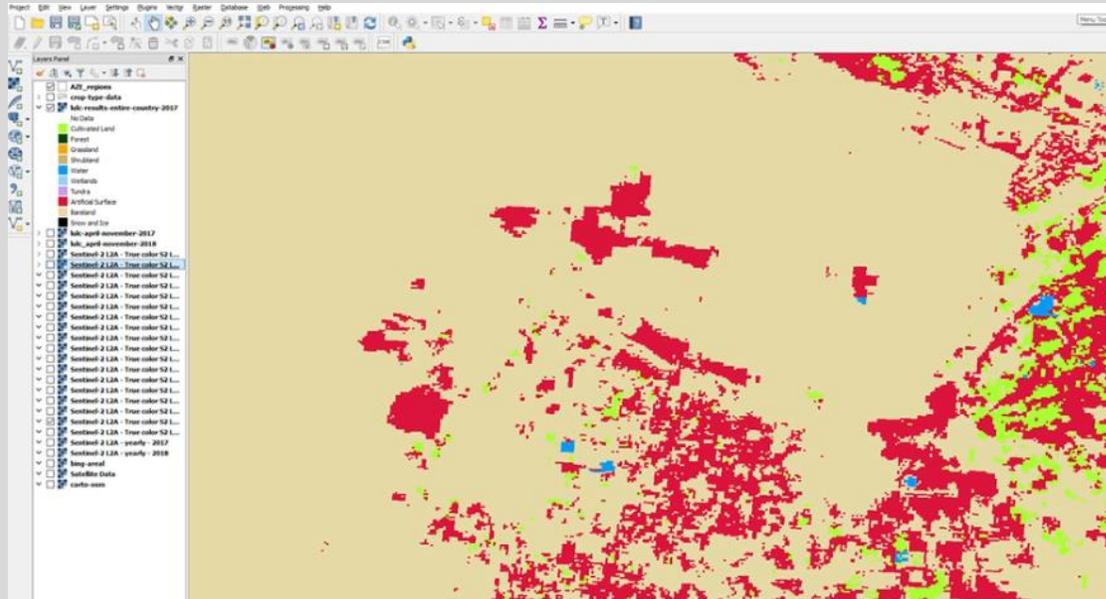
# DISCOVERY OF NEW INSTALLATIONS

Automatic discovery of new installations, construction areas and damaged parts of forests





# NEW INSTALLATIONS ARE DISCOVERED VIA SYSTEM'S ARTIFICIAL INTELLIGENCE



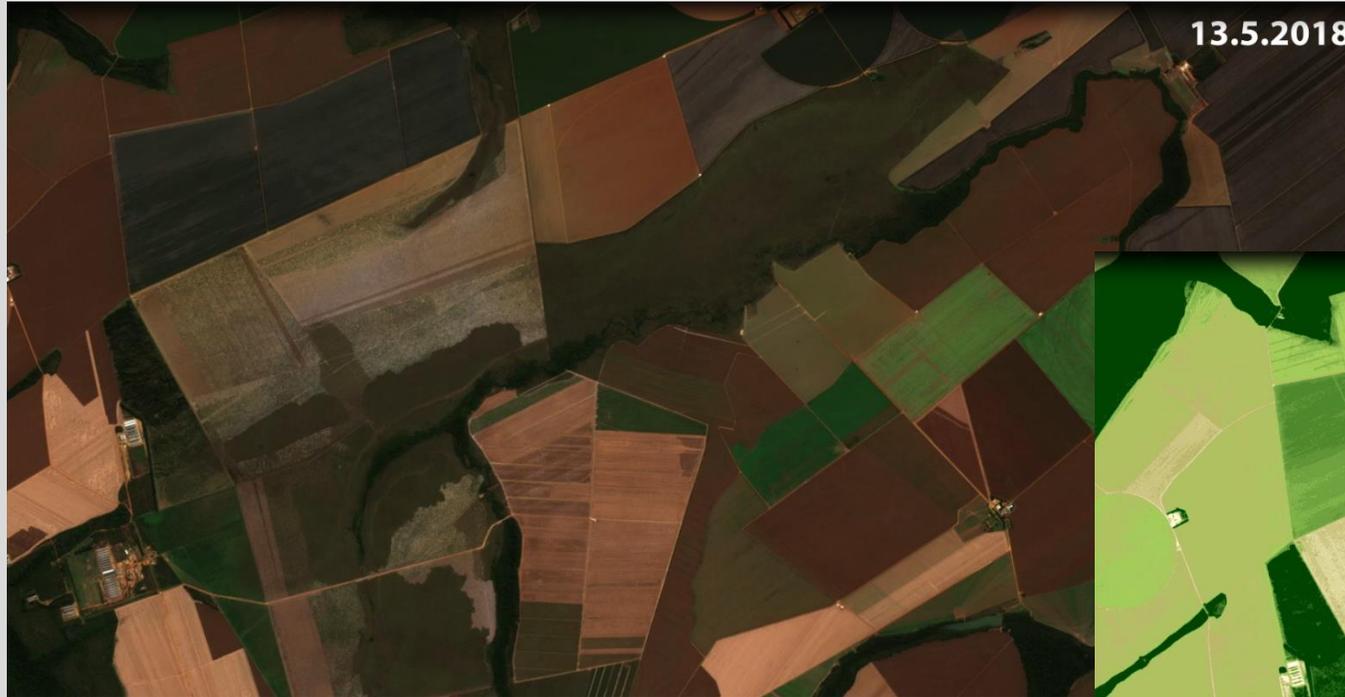
**INFORMATION ON DISCOVERED INSTALLATION IS AUTOMATICALLY DELIVERED TO OPERATOR, AND OPERATOR SUBMIT COORDINATES OF THE INSTALLATION TO LAND INSPECTOR TO FURTHER CHECK**





# MONITORING OF CROPS IN AGRICULTURAL LAND

Before

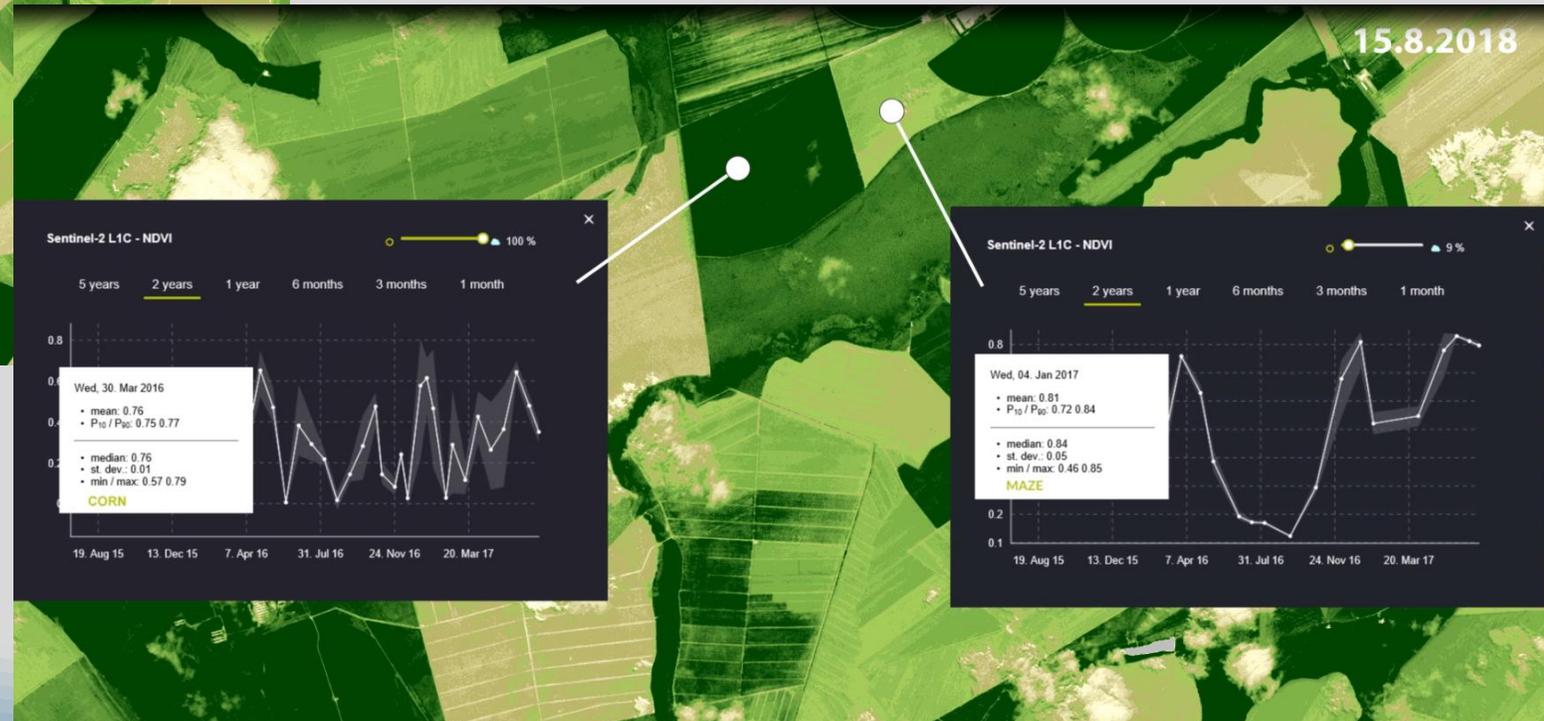
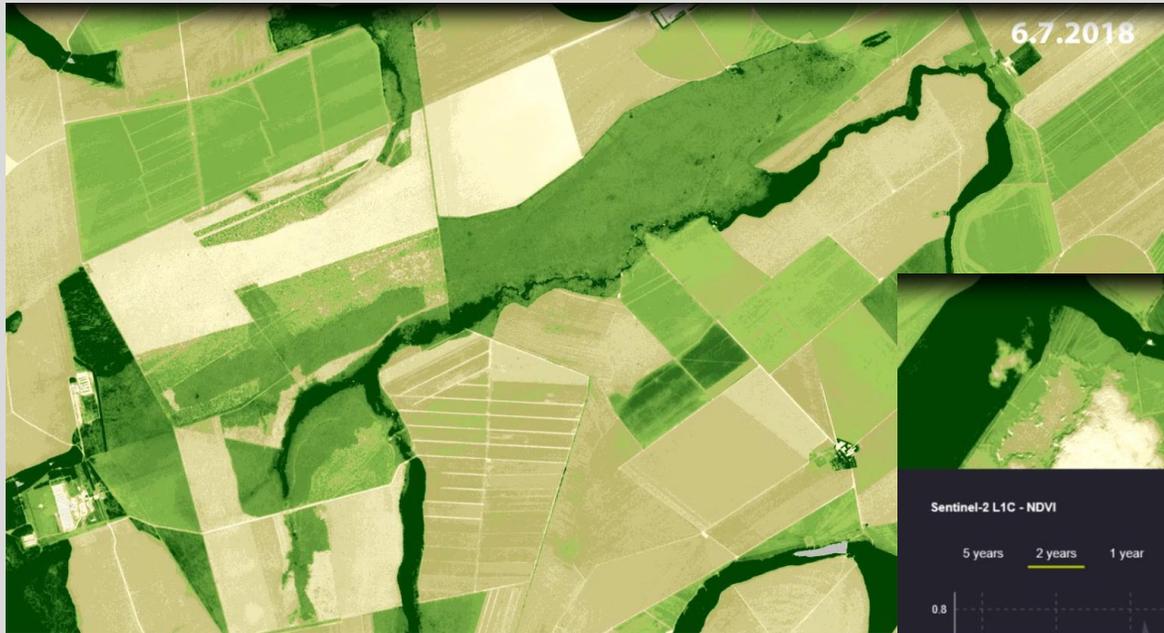


After





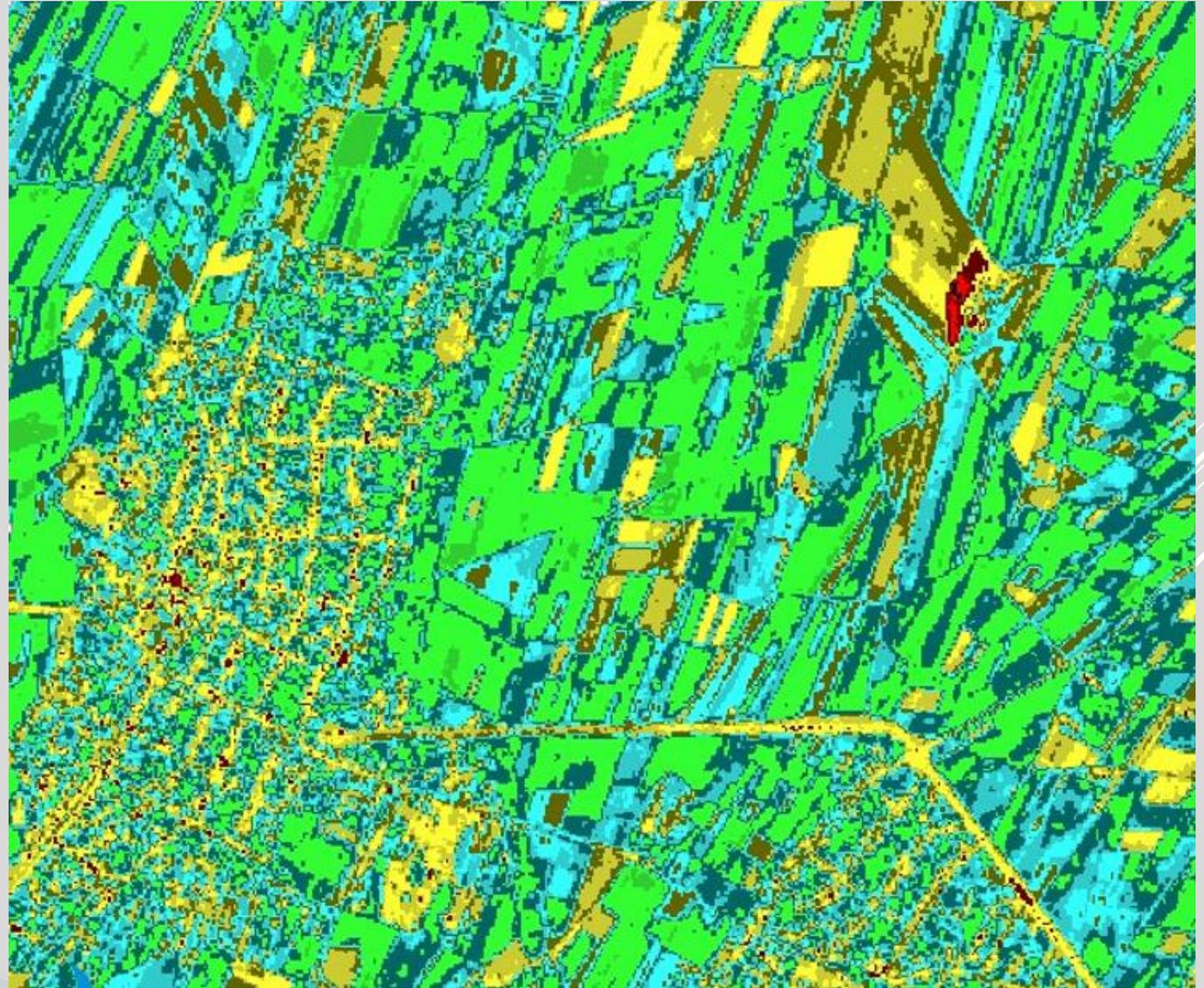
# MONITORING OF CROPS' DEVELOPMENT DYNAMICS





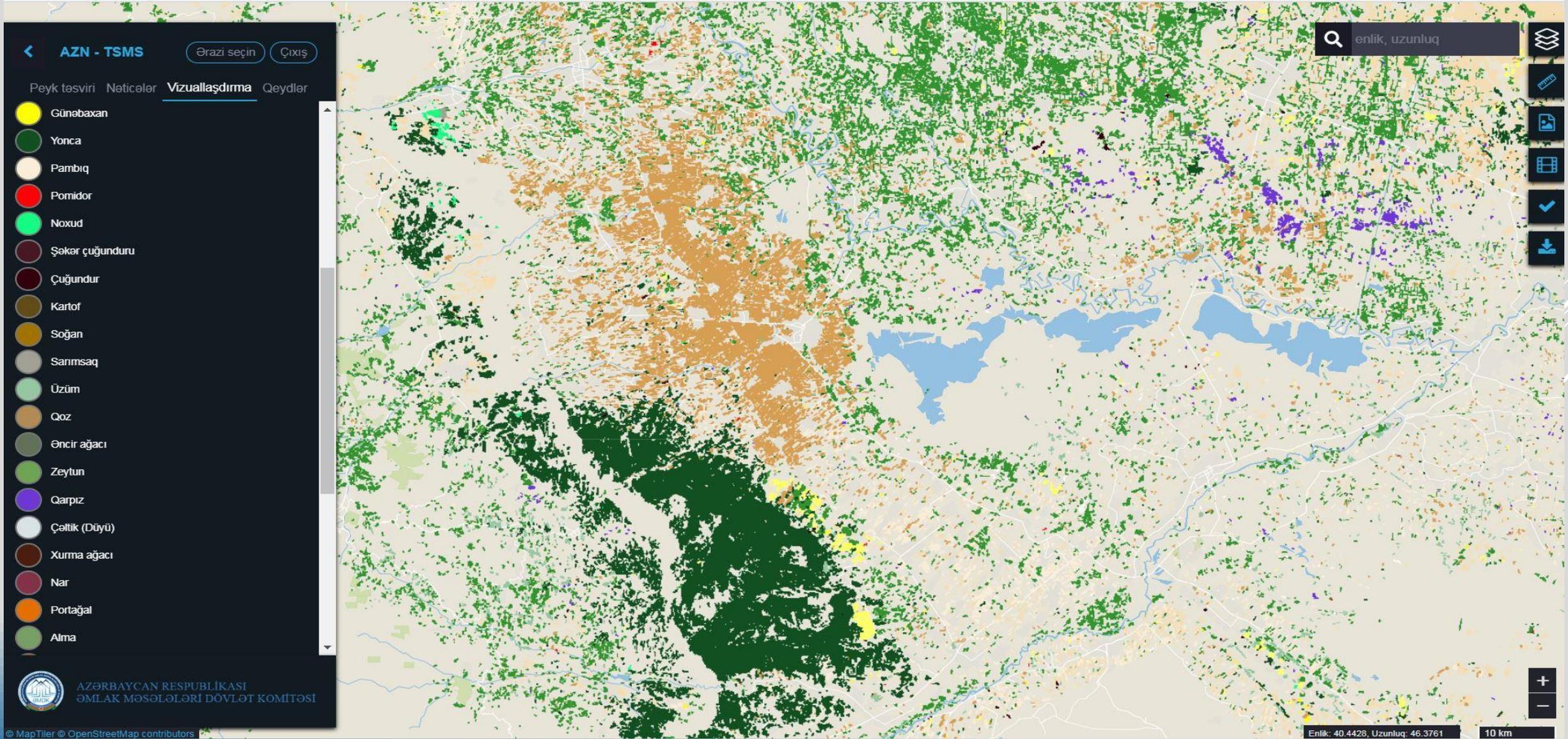
## LEASED AGRICULTURAL LAND PLOTS (GANJA)

**Green is normal crops**





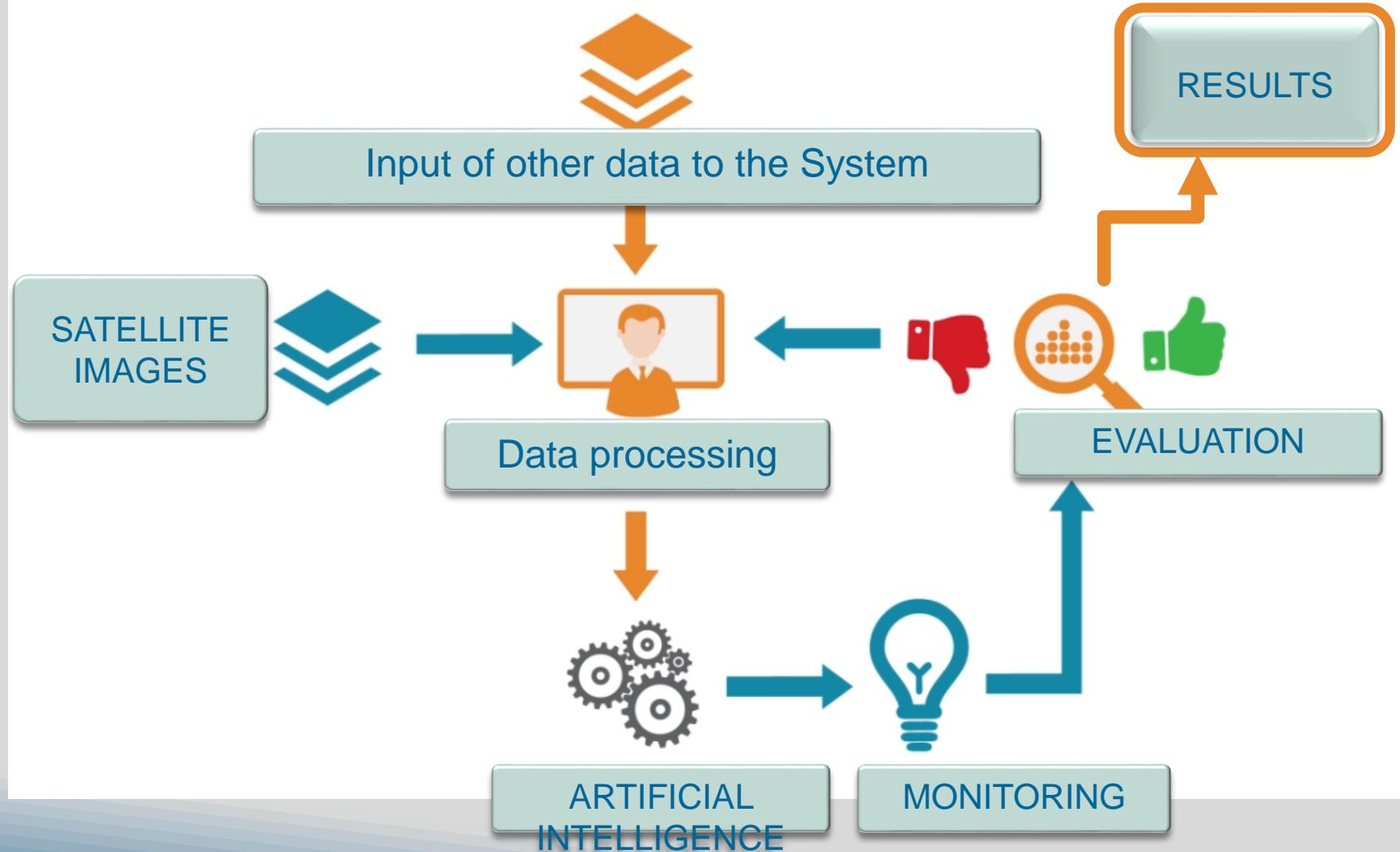
# CROP BREAKDOWN MAP IS PREPARED AS A RESULT OF MONITORING





# PERFORMANCE PRINCIPLE OF SYSTEM'S ARTIFICIAL INTELLIGENCE

Satellite, aircraft or UAV images are input to the System, and the System's artificial intelligence starts analyzing images (automatic processing). The differences between images shot before and after (i.e. land cover changes and their coordinates) are automatically discovered by the System.





## SYSTEM OUTCOMES

**Obtaining satellite images of Azerbaijan's territory**

**Efficient land use by applying innovative technologies**

**Creation of centralized control platform in order to avoid illegal use of lands**

**Optimization of agricultural land use**

**Automatic discovery of area(s) in case of natural disasters and emergency cases**

**THANK YOU FOR YOUR ATTENTION!**