Air quality monitoring automation and legislating PM2.5/PM10 in Uzbekistan

Relevance

- Location:

  Central Asia, **80%** of the territory is **deserts and semi-deserts**

  Arid zone of Asia and is most prone to **the negative effects of climate change**

- Weather:

  Extreme air temperatures up to **45-49°C**

  Increased content of dust in the air due to natural factors (dry climate, sandy and loamy soils)

  The arid climate has a significant impact on the **formation of dust** and its behavior in the atmosphere

- The **Aral Sea ecological catastrophe** has an extremely negative impact on the environment not only of Uzbekistan but on the entire region

Relevance

- Climate of the Aral Sea region:

Sharply continental with extremly cold winters and hot summers

Daily temperature fluctuations - in summer **above +40^{0}C**, and in **winter below -40^{0}C**

Days with temperatures **above 40^{0}C doubled**

Cloud formation and precipitation have decreased, **wind speeds** are reaching **40-45 m/s**

Changes of the Aral Sea:
- Water **inflow decreased** by almost **5 times**

Area of the **water surface** - by **8 times**

Volume of **water mass** - by more than **13 times**

Negative impact:
- **5.5 million hectares** are subject to intense **wind erosion**

100 thousand tons of dust and salts reach even Eastern Europe with winds

Growth of **anemia**, diseases of the **kidneys, blood, gastrointestinal tract, respiratory organs, cardiovascular, gallstone,** and other diseases

Air Quality Monitoring in Uzbekistan

In 25 cities

71 stationary and 1 mobile observation points

8 automatic stations (as of mid. 2023)

17 laboratories of Uzhydromet

Basic Air Quality Monitoring Parameters

- **12** gas compounds and **4 heavy metals** are monitored

- Observations are carried out **3** times a day

- Samples of atmospheric air are analyzed in **17** laboratories

Нукус

Ургенч

Бухара

Навои

Самарканд

Джизак

Карши

Ташкент

Чирчик

Ангрен

Алмалык

Гулистан

Наманган

Андижан

Фергана

Термез

Air Quality Monitoring in Uzbekistan

Main users (beneficiaries) of air quality monitoring results

Uzhydromet in terms of **monitoring** atmospheric air pollution, pollution of surface waters (natural watercourses), soils

Ministry of Natural Resources (environmental control service) to identify **sources of air pollution**, surface waters, and soils, take measures to reduce the level of pollution in the environment

Ministry of Health in the development of **sanitary and hygienic standards**, in particular on fine particles

Ministry of Emergency Situations to eliminate emergencies in case of **extremely high** pollution of the environment

Ministry of Internal Affairs in terms of developing measures to optimize **the traffic flow** to reduce the volume of exhaust gases

Population to take measures in accordance with **the recommendations of the authorized bodies**, depending on the level of pollution

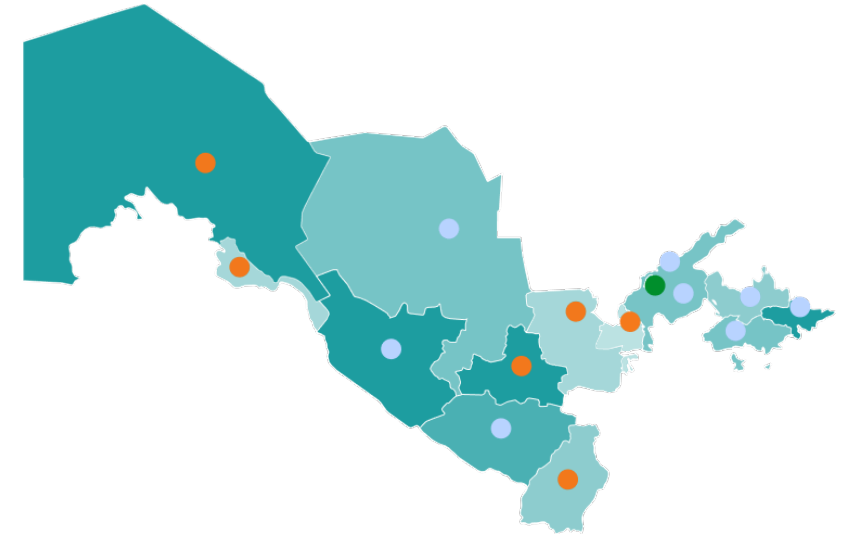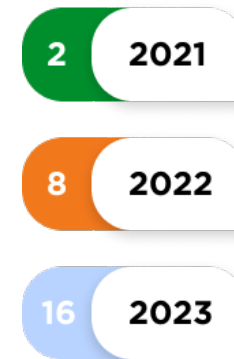# Air Quality Monitoring Automation Project

EXPANSION AND MODERNIZATION OF THE AUTOMATED MONITORING NETWORK

Automation program - minimum **16** automatic stations
(**1** in each region and large industrial cities)

Expected Project Results

- Full air quality monitoring **automation**

- Determination of atmospheric **air quality criteria**

- Improving **the accuracy and quality** of monitoring results

- **Integration** of the national geoinformation system into **international platforms**

- **Development of standards** for the content of **PM2.5/PM10** in the atmospheric air in cities and towns

- Providing **operational information and recommendations** to the public and relevant government agencies

2 — 2021

8 — 2022

16 — 2023

Partners

Ministry
of Natural Resources

Agency
for Hydrometeorological
Service

UN
environment
programme

UNECE

Legislating PM2.5/PM10

Project for a comprehensive assessment of the level of atmospheric air pollution and aerogenic danger to public health

Phase I – 2023 г.

Analysis **of international practice** and experience of a comprehensive assessment of air quality

Development of **the database structure** of atmospheric air pollution by fine particles

Study and analysis **of regional features** of atmospheric air pollution

Development **of criteria** for a comprehensive **assessment** of atmospheric air quality

Determination of biomedical **factors** of aerogenic hazard

Analysis **of the dynamics of the incidence** of the population

Analysis of the dynamics and structure of the incidence of **diseases of dust etiology** among the population

Phase II – 2024 г.

Development **of methodological foundations and methodology** for a comprehensive assessment of atmospheric air quality

Determination of **priority indicators** of atmospheric air pollution

Analysis of **cause-and-effect relationships** between atmospheric air pollution and morbidity of the population

Development **of guidelines** for the use of the AirQ + program **to assess the risk of air pollution** for public health adapted to the conditions of Uzbekistan

Determination and **mapping of areas** with a high level of air pollution

Determination **of the level and dynamics of** atmospheric air pollution

Creation **of spatial and temporal trends** in atmospheric air pollution in certain regions of the republic

Phase III – 2025 г.

Improving **the national information platform** for assessing atmospheric air quality

Raising awareness of all segments of the population about assessing atmospheric air quality

Creating **a thematic atlas of atmospheric air quality** and the degree of infection of the population with diseases of aerogenic etiology

Implementation of a system for providing the Government **with methodological recommendations** for a comprehensive assessment of aerogenic risk to public health

Development and implementation of new sanitary rules, norms and hygiene standards, taking into account natural and climatic conditions

Development of preventive measures on the territory of the republic to reduce atmospheric air pollution
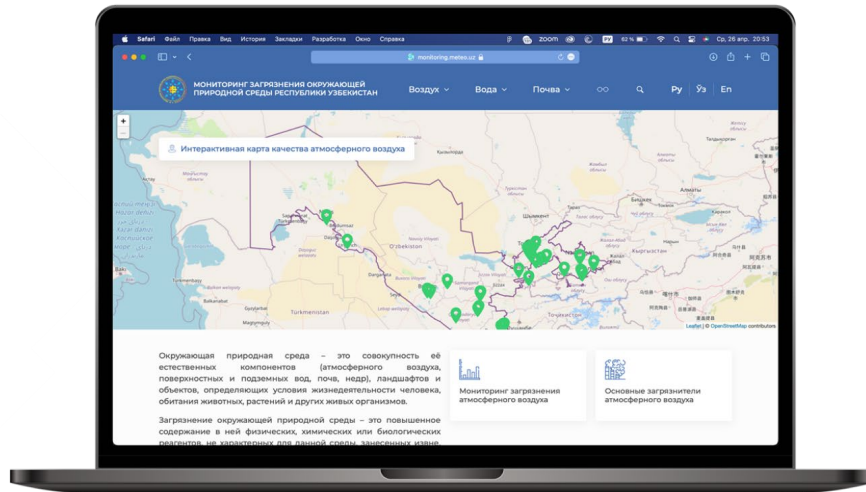and minimize risks to public health

Project Results

UNIFIED MONITORING SYSTEM is created, uniting

- **71** observation point
- **17** laboratories

AIRUZ ONLINE PLATFORM is launched

- **MONITORING.METEO.UZ** website
- **AIRUZ** mobile app

Project Results

8 AUTOMATIC AIR MONITORING STATIONS MANUFACTURED BY THE LEADING COMPANY HORIBA (JAPAN, GERMANY) ARE INSTALLED

- Data processing is formed on a **single basis**
- The possibility of **integration** with external information systems
- The efficiency of providing information on the state of atmospheric air increased **from 2 days to 1 hour**
- The accuracy of the results increased from **90-92%** to **98-99%**

5 INTERNATIONAL STANDARDS FOR AIR POLLUTION MONITORING HAVE BEEN UPDATED

PRACTICAL SEMINARS-TRAININGS WERE HELD
- with coverage of **100** specialists of the sphere