NATIONAL INSTITUTE OF DESERTS, FLORA AND FAUNA OF THE MINISTRY OF AGRICULTURE AND ENVIRONMENT PROTECTION

INTERNATIONAL SYPMOSIUM ON RECOVERY AND ENVIRONMENTAL MANAGEMENT OF THE ARAL SEA REGION

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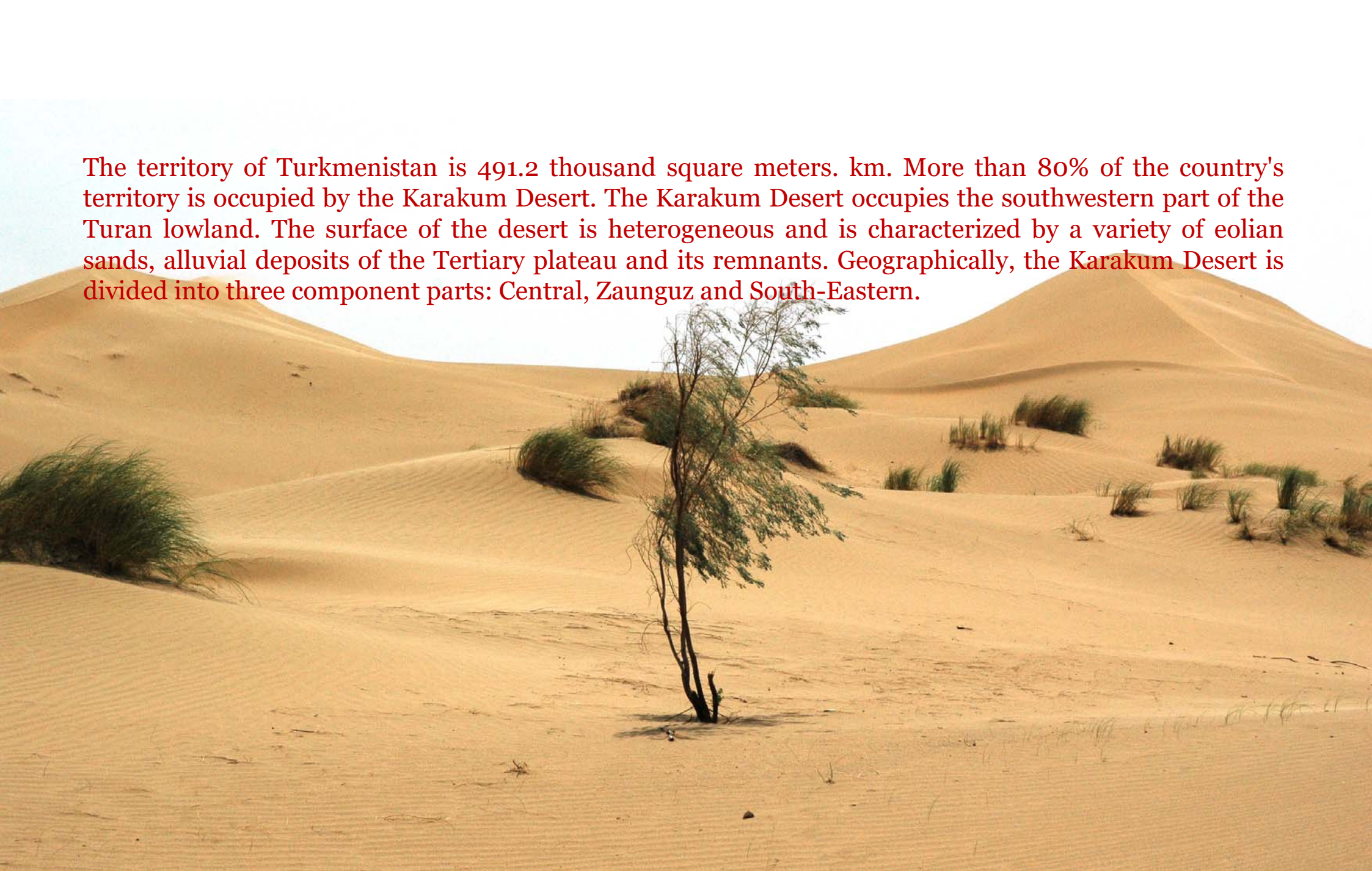
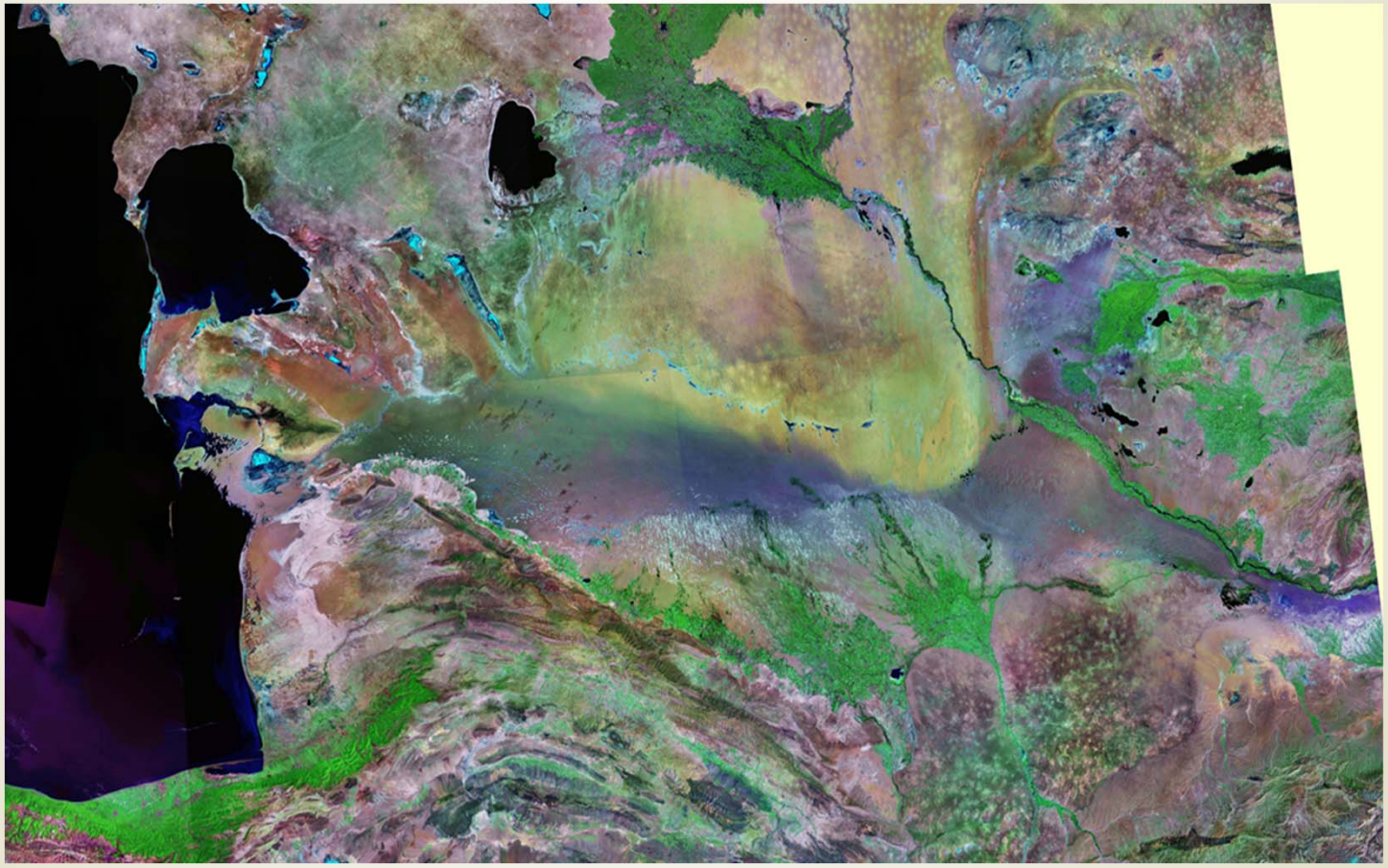
The territory of Turkmenistan is 491.2 thousand square meters. km. More than 80% of the country's territory is occupied by the Karakum Desert. The Karakum Desert occupies the southwestern part of the Turan lowland. The surface of the desert is heterogeneous and is characterized by a variety of eolian sands, alluvial deposits of the Tertiary plateau and its remnants. Geographically, the Karakum Desert is divided into three component parts: Central, Zaunguz and South-Eastern.



Map of Turkmenistan with Karakum desert



Combating desertification is a priority task of the environmental policy of Turkmenistan

- Anthropogenic impacts on arid territories, causing intensification of desertification processes and land degradation:
  - over-exploitation;
  - overgrazing and deforestation;
  - irrational irrigation methods.

- The combat against desertification is the subject of the environmental policy of President of Turkmenistan Gurbanguly Berdimuhamedov, who attaches great importance to the issues of environmental protection and rational use of natural resources, bearing in mind, first of all, the use of land and water resources

- Turkmenistan was among the first to join the UN Convention to Combat Desertification, and in 1996 the country's Mejlis ratified it.

Main goals and objectives of the Institute

The Institute was founded in 1962 to develop methods for studying natural conditions, desertification processes, as well as measures to combat desertification. The objectives of the institute were:

- Development of scientific foundations for the rational use, reproduction, transformation of the biosphere of desert territories on the basis of comprehensive research
- Restoration and rational use of forests and pastures, development of methods for plant protection and use of animals
- Development of scientific foundations for agricultural development of sands and sandy lands.
- Development of phytomelioration and methods of dealing with technical sandy sediments and blowing out of various economic objects.
- Study of flora and fauna, biodiversity of deserts of Turkmenistan in connection with climate change
- Analysis and generalization of world experience and study of the development of deserts.

The main directions of research work of the Institute are currently:

- **Development:**
- **- Technologies of recovering and improvement of degraded forestpasureland;**
- **Complex of activities on rational use soil-water resources;**
- **Recommendations on protection of highways and railways and other household objects from sand drifts and blowing;**
- **Scientific foundations for the development of a network of specially protected natural areas and recommendations for improving their management;**
- **Comprehensive study of the biodiversity of flora and fauna, the creation of a databank and the State cadasters;**
- **Monitoring of endemic, rare and endangered species of animals and plants, their protection and maintenance of the national Red Book.**

1. Laboratory of Ecology of forests and pasturelands

- **Development technology of recovering and improvement**:

- degraded forestpasturelands of central Kopetdag mountains;

- degraded pastures on saline lands of the Central Karakum desert and their rational use;

- establishing gardens of elite forms of nut-bearing plants;

- **Laboratory research dedicated to:**

- development of theoretical foundations and scientifically based recommendations for improving agrotechnical technology;

- technologies for growing seed and planting material by irrigation with mineralized waters.

GROWING PISTACHIO AND ALMOND IN CENTRAL KARAKUM





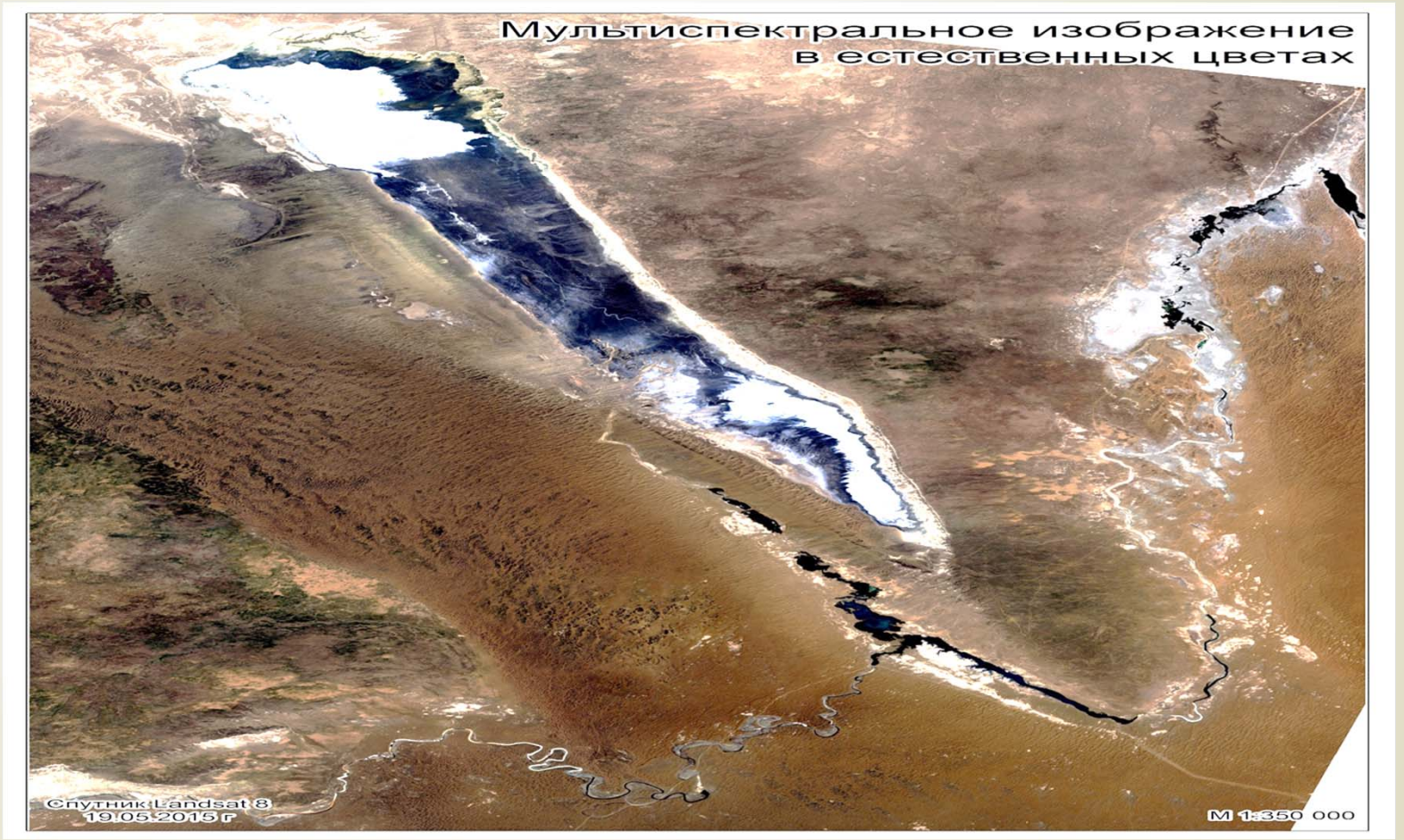

PLANTING OF PISTACHIO AND ALMONDS IN THE EXPERIMENTAL PLOTS OF *BOKURDAK* (CENTRAL KARAKUM)

GROWING OF PISTACHIO IN THE EXPERIMENTAL PLOT OF *KARRYKUL* IRRIGATION BY ATMOSPHERIC PRECIPITATION (CENTRAL KARAKUM)

2. LABORATORY OF BIODIVERSITY

- Investigation of biodiversity of Turkmenistan and creation database and State cadastre;
- Investigation and conservation rare and endangered species of plants and animals, maintenance the Red Data Book;
- Study of the state of biodiversity of insects in forest ecosystems and development of environmentally friendly methods of combating harmful species;
- Scientific research (including taxonomic) of plants and animals using GIS technologies;
- Monitoring the state of flora and fauna, including alien invasive species that pose a potential threat to ecosystems;
- Creation of a database on biodiversity of specially protected natural areas with regular updating of it with new information.

Study of flora and vegetation, as well as fauna of the region of the Turkmen lake "Altyn Asyr" (space image)



The creation of the Turkmen lake "Altyn Asyr" with a network of collectors allows:

- - to collect drainage water from agricultural fields in one place and prevent the degradation of desert lands and pastures;
- - not to dump the used water back into the Amu Darya;
- - create conditions for increasing biodiversity in the water area of the lake;
- - improve the ecological situation in the region;
- develop distant pasture livestock here

The current state of vegetation in the area of the collecting collector of the Turkmen "Altyn Asyr"

1- *Artemisieta kemrudicae;*

2 - *Artemisieta badhysi;*

3 - *Salsoleta arbusculae;*

4 - *Salsoleta gemmasceni;*

5- *Anabasieta salsae;*

6- *Reaumurieta fruticosae;*

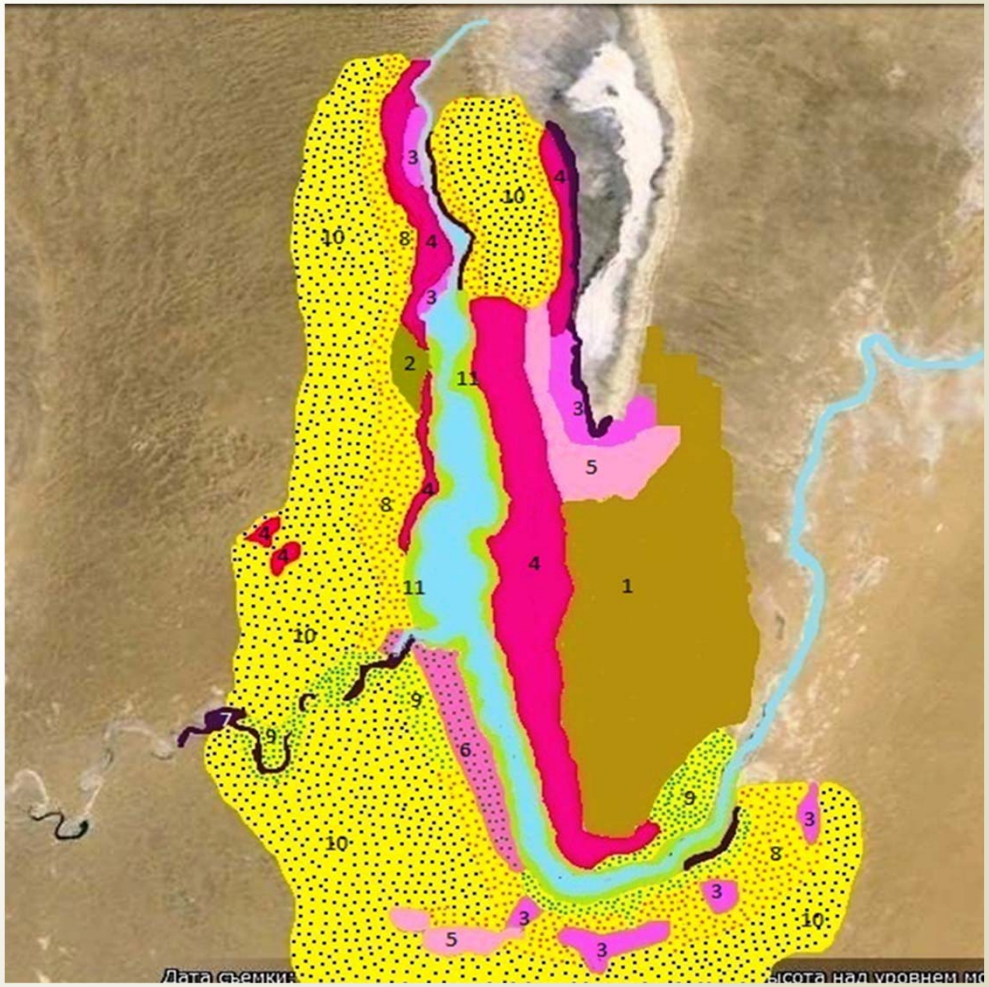
7- *Halocnemeta strobilacei;*

8 - *Salsoleta richteri, Artemisieta santolinae* and *Ephedreta strobilaci* formations;

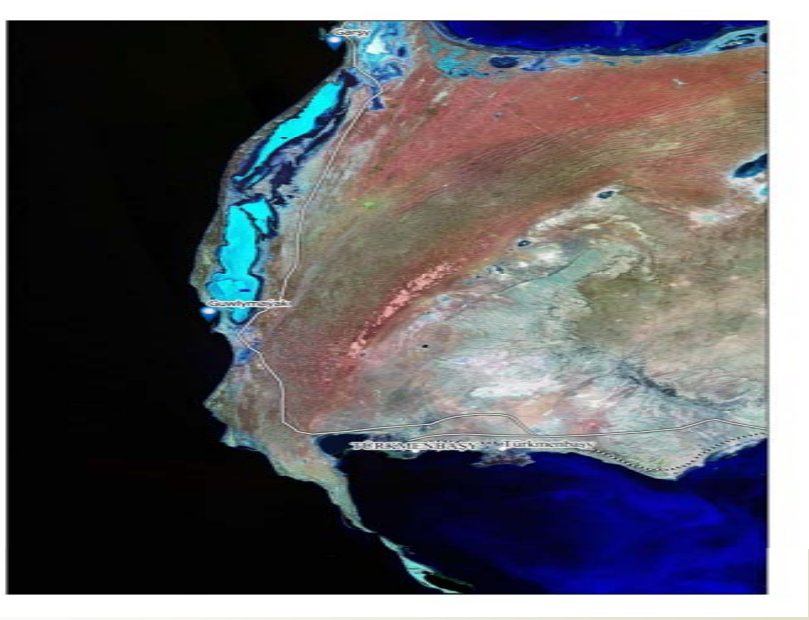
9 - *Haloxyloneta aphylli;*

10 – *Haloxyloneta persici;*

11 - *Tamariceta laxae*



Study of vegetation, biodiversity of the Caspian deserts, the Turkmen coast of the Caspian Sea



3. Laboratory of Desertification monitoring and sand fixation

- Research area:

- deflationary processes in the desert territories of Turkmenistan;

- patterns of formation, development and distribution of aeolian relief;

- the impact of the collector-drainage system of the lake "Altyn Asyr" on the environment and the development of methods for securing their shores from falling asleep.

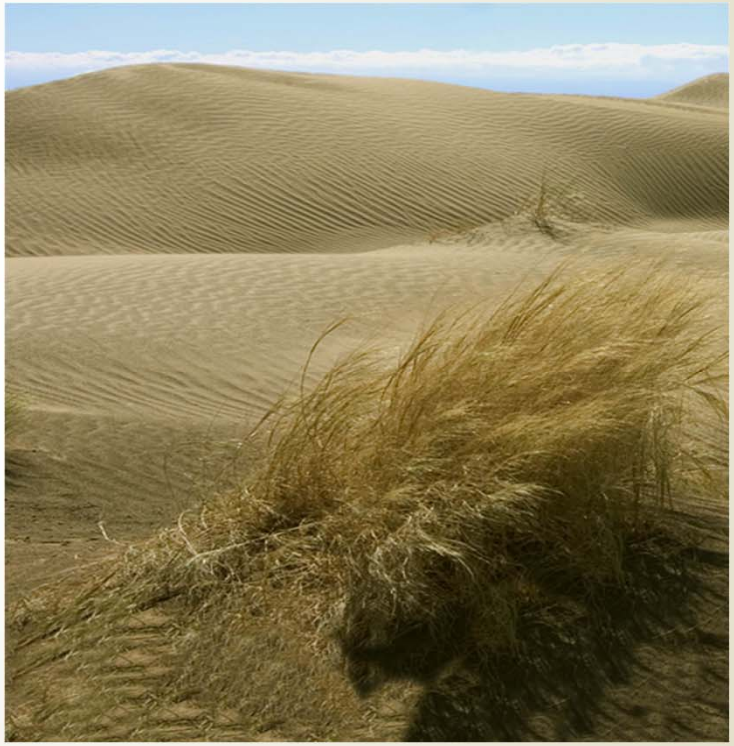
Development:

- scientifically grounded recommendations for the protection of railways, highways, economic facilities and engineering structures from sand drifts and blowing;

- recommendations for choosing the best options for the placement of economic facilities and their protection from sand drifts and blowing;

- recommendations for the consolidation and afforestation of dune sands by creating a system of protective plantations

Dune sands near the Bokurdak village in the Central Karakum Desert



Sands fixation: using a reed and cattail mat with planting shrubs in cells; planting white saxaul

IMPLEMENTATION OF THE NATIONAL FOREST PROGRAM IN TURKMENISTAN (2013 - 2020)

- **The National Forest Program initiated by the respected President of Turkmenistan Gurbanguly Berdimuhamedov, adopted in 2013 and successfully implemented to date, has become in addressing issues of environmental protection, preventing the negative consequences of climate change, preserving and increasing the country's richest biodiversity.Программа нацелена:**

- to improve the protection and increase of forest resources;

- their rational and careful use;

- establishing sustainable management of the entire forestry.

MAIN DIRECTIONS OF FORESTRY DEVELOPMENT IN TURKMENISTAN (2013 - 2020)

- Planting 3 million tree seedlings annually;
- Afforestation of 20 thousand hectares of land in the Turkmen zone of the Aral Sea region;
- Organization of work to increase the cultivation of rare plants in state nature reserves;
- Creature:
- - vast green areas on the territory of the Avaza National Tourist Zone;
- -network of protective forest belts on agricultural lands in order to adapt to climate change and increase crop yields;
- Carrying out:
- - scientific research on the development of forestry and plant cultivation along the collectors of the Turkmen lake "Altyn Asyr"; inventory and accounting of forests;
- Preparation of normative legal acts arising from the Forest Code of Turkmenistan.

Artificial forest plantations in the foothills of the Kopetdag, in the vicinity of Ashgabat prevent:

- negative consequences of climate change;

- protection of the city from dust storms (including from the Aral Sea region);

- create a favorable microclimate

Artificial forest plantations in the vicinity of Ashgabat

Artificial plantations of saxaul in the vicinity of settlement of Karakum desert

Forest plantations in the Aral zone of Turkmenistan

Salt and dust transfer from the dried bottom of the Aral Sea to the territory of Turkmenistan has a negative impact on agricultural fields and pastures, and public health.

Leads to land salinization, woodlands, reduction of biodiversity; intensification of desertification processes, air pollution, and deterioration of the ecological situation.

According to the National Forest Program of Turkmenistan (2013-2020), in order to reduce the negative impact of the dried-up bottom of the Aral Sea in the northern regions of Dashoguz and Lebap velayats, it is planned to plant desert plants.

At present, almost 20 thousand hectares of desert plants have been planted.

Afforestation activities in the Aral zone of Turkmenistan – Botendag mountains

The legal framework for the country's environmental activities:

- Law of Turkmenistan "On the protection of the ozone layer", 2009,
- "Forest Code of Turkmenistan", 2011,
- Law of Turkmenistan "On fishing and conservation of aquatic biological resources", 2011,
- Law of Turkmenistan "On Specially Protected Natural Areas", 2012,
- Law of Turkmenistan "On flora", 2012,
- Law of Turkmenistan "On Animal World", 2013,
- "Code of Turkmenistan on Administrative Offenses", 2013,
- Law of Turkmenistan "On Nature Protection", 2014,
- Law of Turkmenistan "On Environmental Expertise", 2014, etc.
- Law on Land Reclamation, (2018);
- Environmental Information Law (2020) and others.

TOTAL: 27 environmental laws were adopted, 12 of them were updated, 13 were adopted for the first time.

International cooperation

Cooperation in the framework of UN convention

- CCD - The Institute works closely in research on prevention of desertification, land degradation, capacity building and sustainable management of natural resources of local residents
- CBD - Research is underway to study the state of biodiversity of the Caspian Sea
- UNFCCC - The staff of the institute is involved in adaptation activities and in the preparation of a national strategy on climate change

and other


Thank you for your attention !