

Scientific and production Center for Forest Research named after P.A. Ghan of Institute of Biology of National Academy of Sciences of Kyrgyz Republic



Main ways of development of scientific potential of Kyrgyzstan forests' preservation and recovery.



Forests of Kyrgyzstan



Juniper (juniper) forests (*Juniperus*)



Juniper forests occupy large areas, providing a kind of zone of coniferous woody vegetation. They are mainly located on steep slopes and play a huge ecological role. The tall stand of juniper forests is formed by **Turkestan juniper** (*Juniperus turkestanica*), **Hemispherical juniper** (*J. semiglobosa*) and **Zeravshan juniper** (*J. seravshanica*). The total area of juniper tree is **202.5 thousand hectares**, which is **18.1 %** of the total forested area. Dwarfs are represented mainly by creeping juniper. The total area of juniper cossack (*J. sabina*) is **101 thousand hectares**.

Juniper (juniper) forests



2900 - 3600M
J. turkestanica



2400 - 3100M
J. turkestanica



1900 - 2900M
J. semiglobosa



1700 - 2200M
J. seravschanica





Walnut forests (*Júglans régia*)

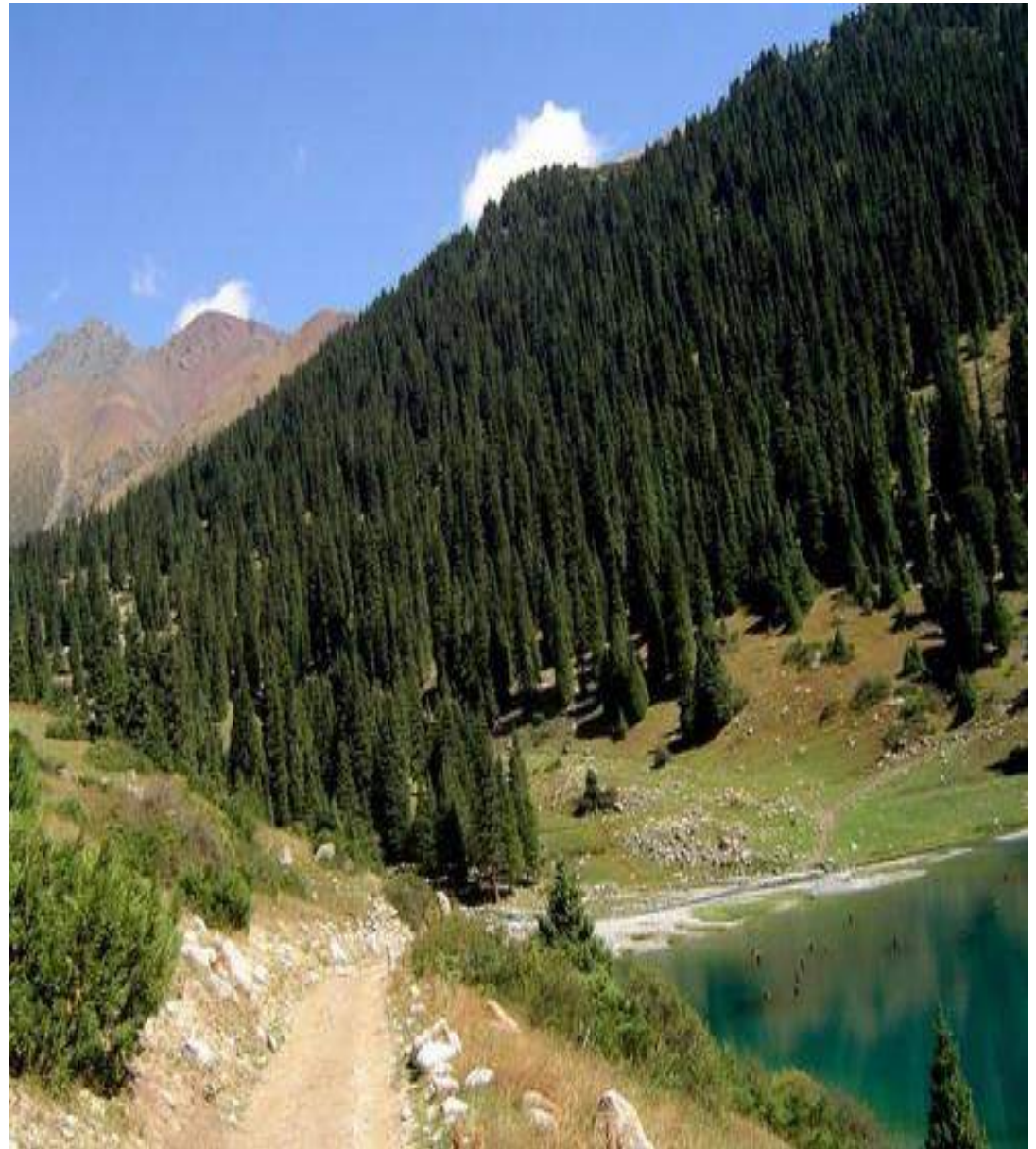
The total area of nut-fruit forests (*Juglans regia*) is 631 thousand hectares. They are located in the south of Kyrgyzstan along the western and southwestern slopes of the Fergana and Chatkal ranges, which are spurs of the Tien Shan mountain system.

A unique array of wild nut-fruit forests formed by walnut, pistachio, various types of apple trees, pears, hawthorns, cherry plums and other numerous types of fruit and non-fruit trees and shrubs.

Spruce forests (*Picea schrenkiana* subsp. *tianschanica*)

The area of relict forests of Tien Shan spruce (*Picea schrenkiana* subsp. *Tianschanica*) is 120.4 thousand hectares, 14% of the total forest area of the republic.

Spruce forests are of great environmental, cultural, aesthetic and economic importance. Spruce forests are mainly concentrated in the north of the republic – in the Issyk-Kul, Naryn and Chui regions. In the south of the Kyrgyz Republic, they are found in relatively small massifs: Sary-Chelek Nature Reserve, in the Arkyt, Uzgen and Avletim forestry farms, in the Kara-Shoro National Park, etc.



Tugai forests

In mountainous areas, tugai or floodplain forests are located along the floodplains and banks of large rivers: Naryn, Chu, Tup, Talas, Suusamyr, Dzhergalan, Zhazy and along many small rivers. The species composition of floodplain forests depends on adaptability to environmental conditions and competitive relationships between tree and shrub species. The main functions of floodplain forests are bank protection.

In the mountains, along the banks, floodplains and river deltas, tree and shrub vegetation grows in the form of intermittent narrow forest belts, often forming tugai forests of **black poplar** (*Populus nigra*), **turanga** (*Populus diversifolia*), **white willow** (*Salix alba*), **birch** (*Betula*), **sea buckthorn** (*Hippophae rhamnoides*), etc.



Fir forests (*Abies Semonovii*)

The forest-forming breed - Semenov fir (*Abies Semonovii*), listed in the Red Book of the Kyrgyz Republic, covers an area of 3.4 thousand hectares and 1% of the republic's forest area. It is endemic to Kyrgyzstan.

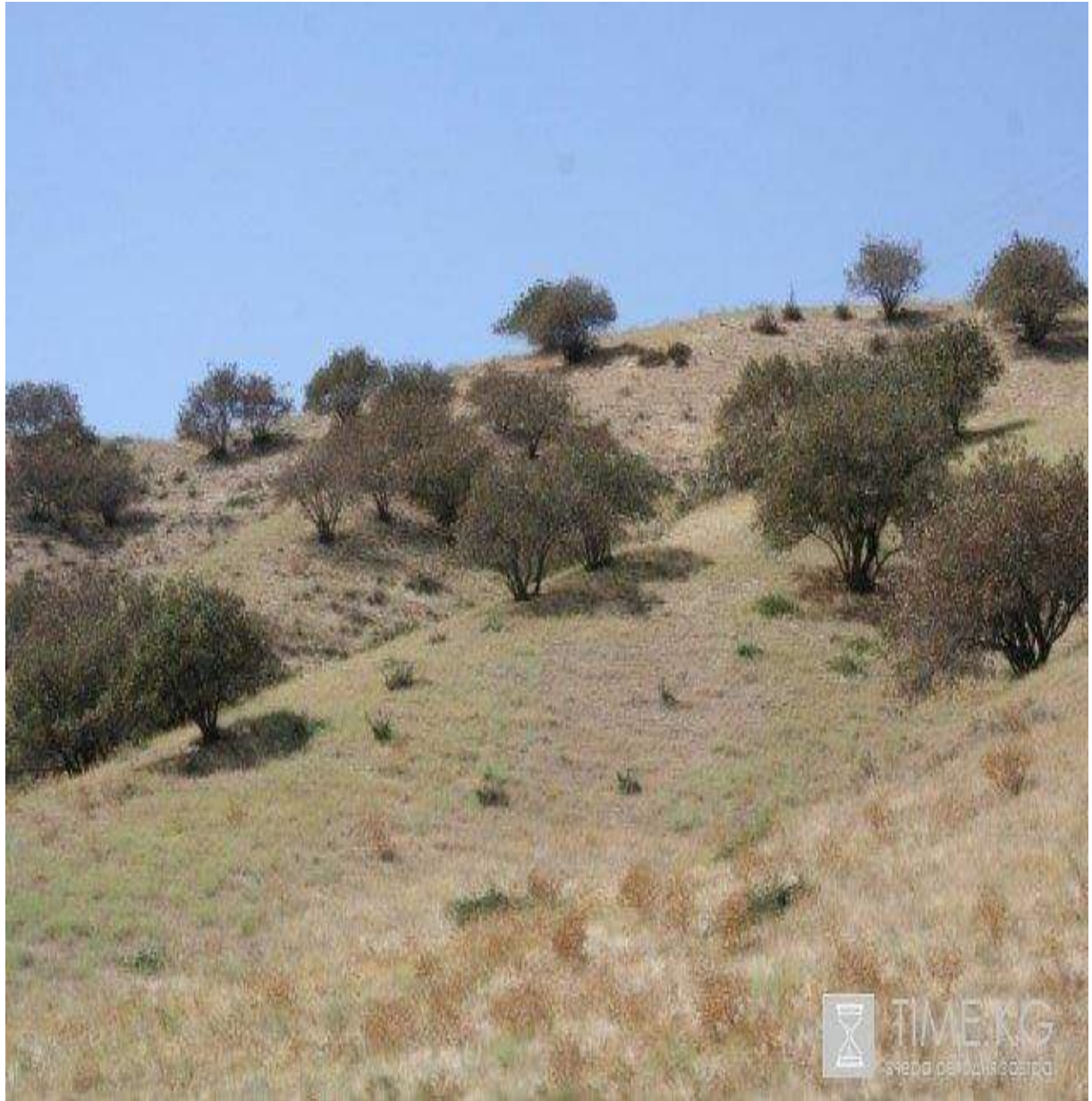
Fir forests have a very limited distribution. Currently, they have been preserved mainly only in the south of Kyrgyzstan on the slopes of the Western Tien Shan, where they occupy mainly moistened slopes of the northern exposure. Insignificant in area are clean or found on the territory of the Toktogul, Avletim, Irkutsk forestry in the basins of the Padyshat, Karasuu, Uzun-Akmat rivers, in the Chichkan River basin and on the territory of the Sary-Chelek Nature Reserve.

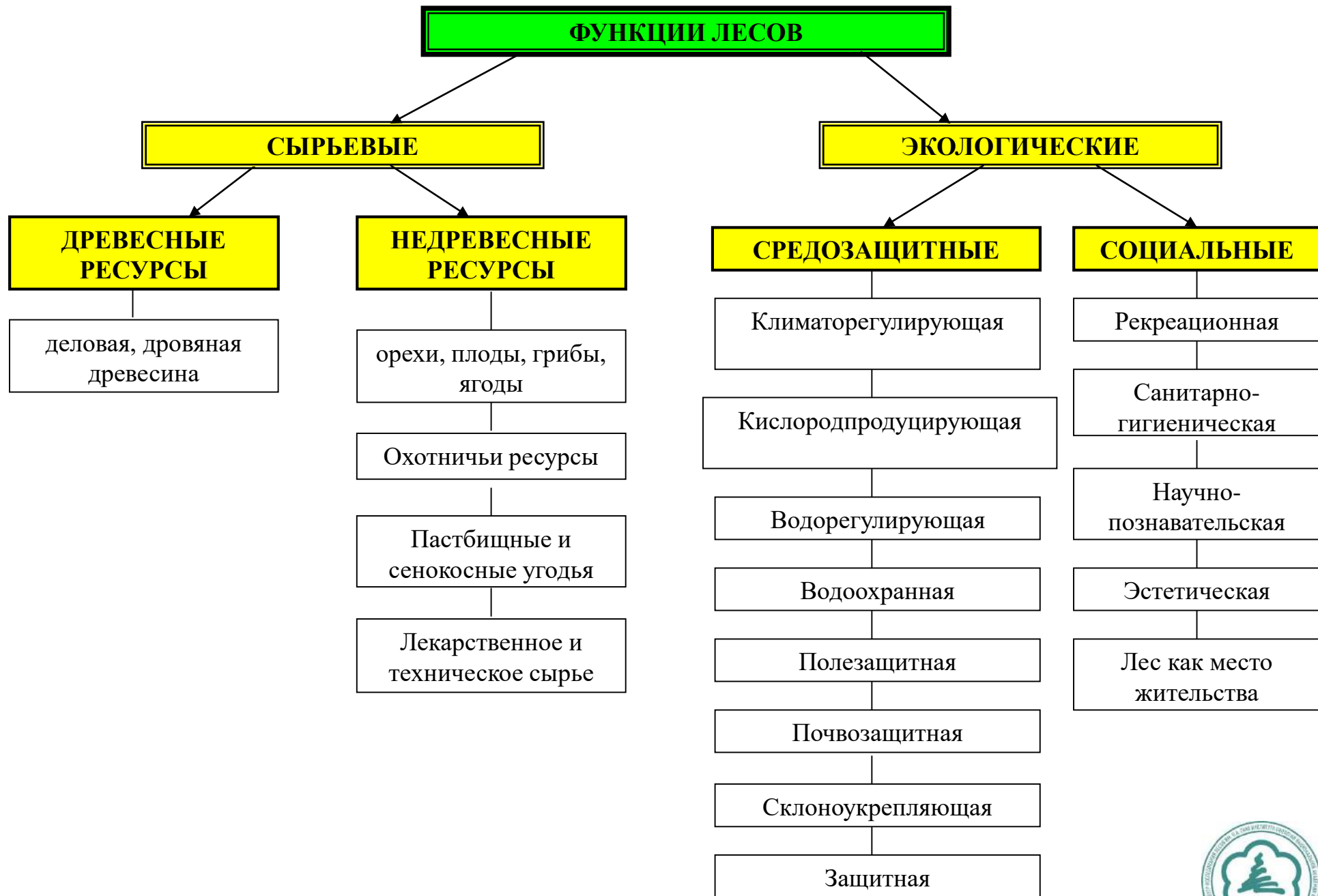


Pistachio and almond woodlands (*Pistacia*)

The area of pistachio woodlands (*Pistacia*) is 33.8 thousand hectares, 4% of all forests of the republic. Almond (*Amygdalus*) is 2.7 thousand hectares.

Pistachio and almond plantations grow on hilly foothills (adyras) and low mountains in very arid conditions. Here they are located on the slopes of all expositions of various steepness. Pistachio is often found on eroded slopes with the release of bedrock. The ability of pistachios and almonds to grow in very harsh conditions is the most valuable property for performing protective functions.





Structure SPCFR IB NAS KR:

Management Department

Laboratory:
Forestry

Laboratory:
Forest crops and breeding

Laboratory:
Ecology and forest protection

Laboratory:
Economies and organizations of forestry

Laboratory:
Monitoring of forest ecosystems

Ak-Suu Forest Experimental Station (Issyk-Kul region) – 1562 ha.

Sary-Bulak stronghold with the Taldy-Bulak section (Chui region) – 60 ha.

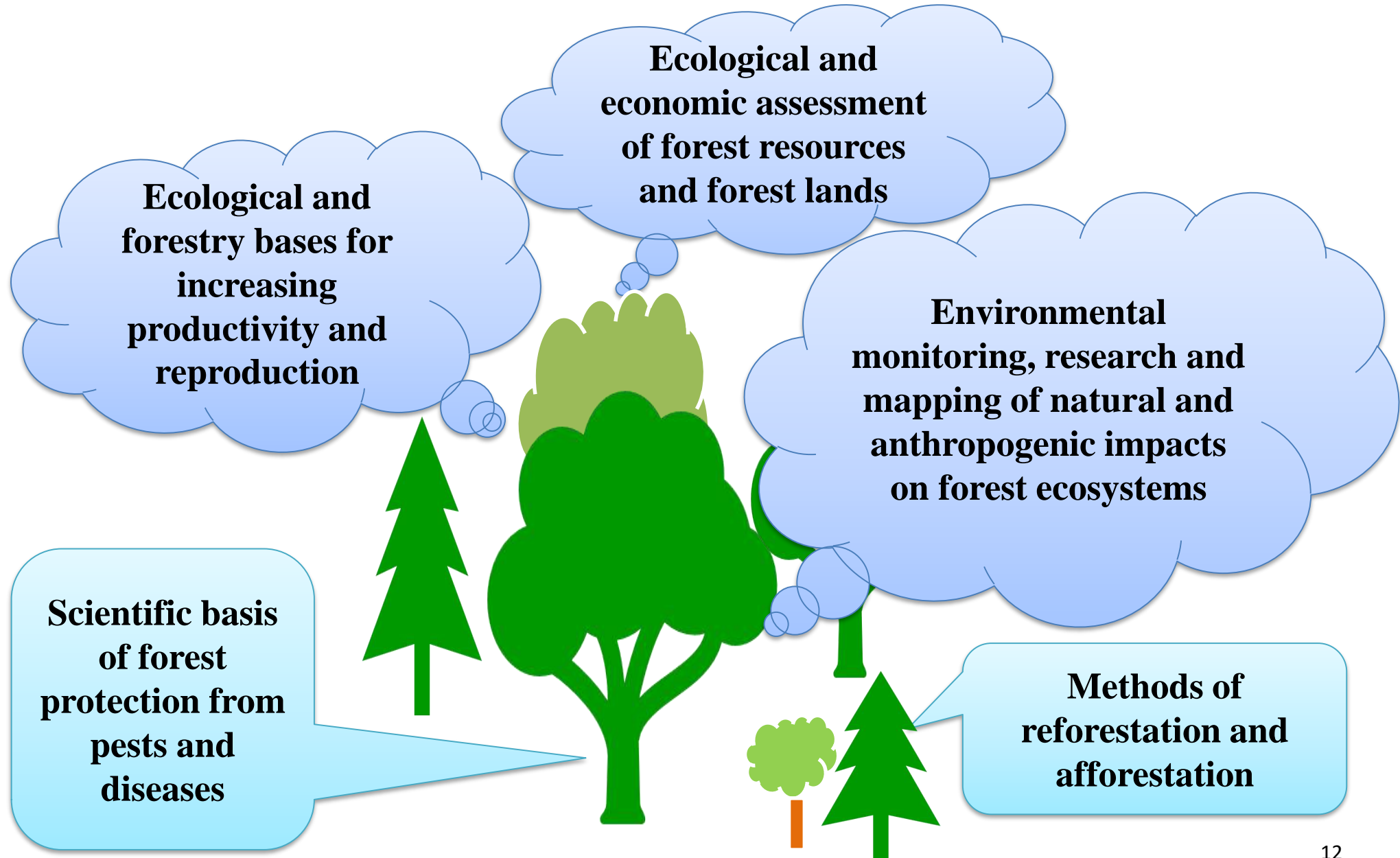
Arboretum "Kara-Oy" (Issyk-Kul region) – 31,4 ha.

Arboretum in Bishkek – 10 ha.

SPCFR has 5 laboratories, as well as scientific experimental sites

Main directions of scientific activity:

Схема 2.



In the spring of 2021, a repellent from the apple codling moth (*Cydia pomonella*), Dasan, was tested for an experiment in the amount of 1000 pcs. This repellent works on the principle of scaring away the pest from the protected fruit area. According to the proposed scheme, repellents were hung in apple orchards.



Protecting an oak tree from the oak leaf miner (*Profenusa pigmaea*) by tree injection.



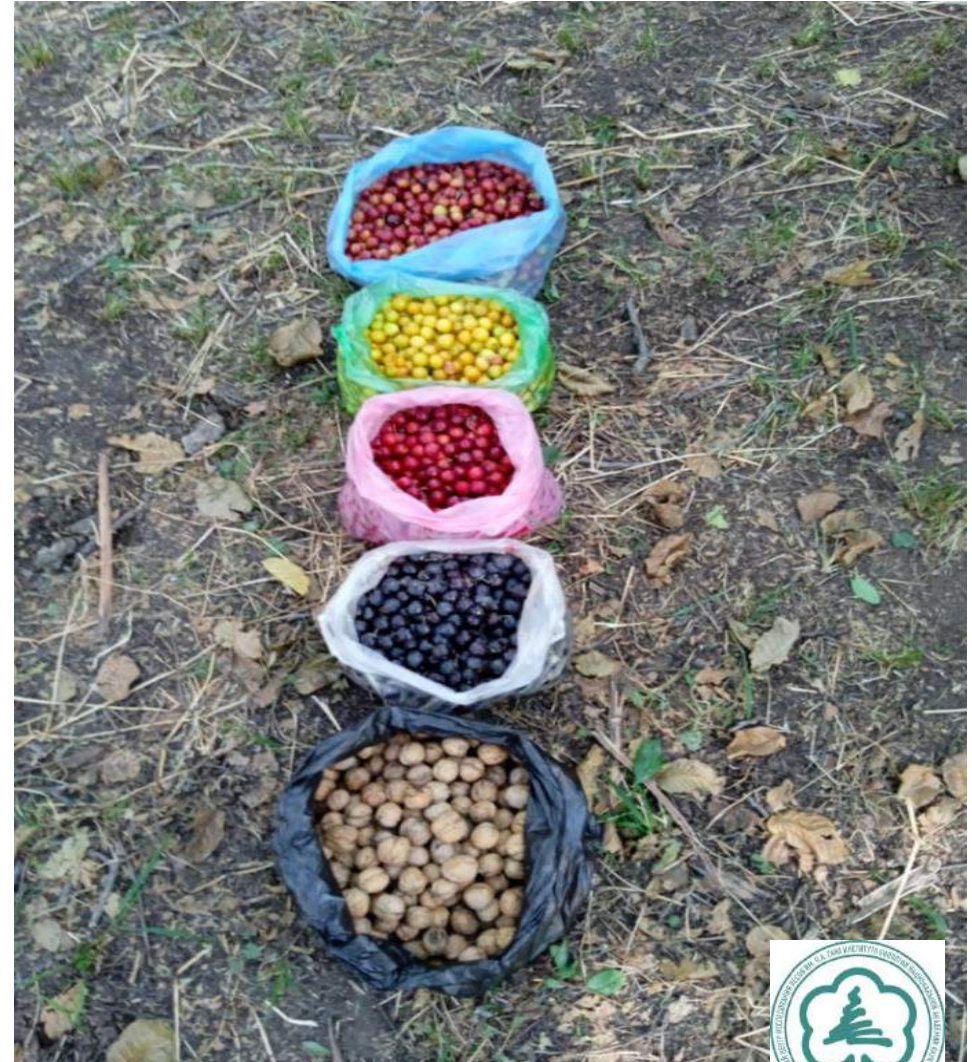
For the first time in Kyrgyzstan, a thorny form of sea buckthorn was found in natural populations of sea buckthorn. Thornless sea buckthorn shrubs have been marked on the map for further scientific observation.



Rare and endangered plant species are being planted in the arboretum, where 5 species are planted: Nedzwiecki's apple tree (*Malus niedzwezryana*); Exochord (*Exochorda albertii*); Hawthorn blood red (*Crataégus sanguíne*); Fir Semenov (*Abies semenovii*); Spruce Tien-Shan (*Picea schrenkiana*).




In natural walnut forests, we harvested economically valuable, selected walnut seeds from plus trees of natural origin, and also harvested seeds of cherry plum (Sogdian plum) of different colors; red, orange, yellow and black.



The cultivation of the most promising varieties and hybrids of poplars from Germany and Italy continues.





**The main problems of studying
the forest ecosystem**

1. Most of the woodlands have reached the age of the above-storey class. The main problem remains the need to monitor forests for the condition of natural plantings growing in the mountain system of Kyrgyzstan.



2. The issue of harvesting and collecting seeds for growing planting material remains acute. This affects the inaccessibility of harvesting, high risks during harvesting and seed harvesting.



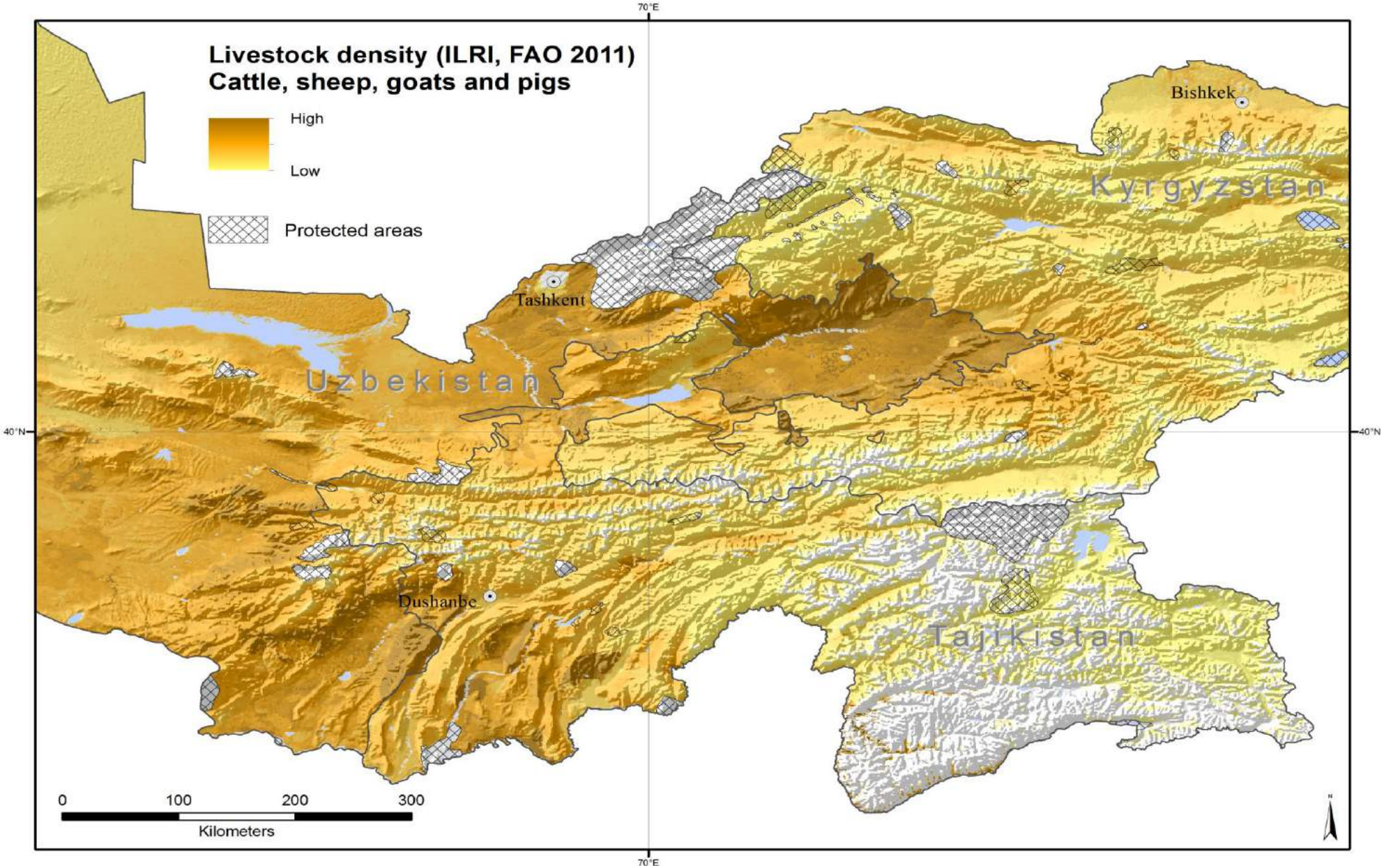
Pests and diseases cause the greatest damage to the harvest of cones, fruits and seeds, forest seed business, destroying a significant part of the crop. Damaged seeds, getting into the seed fund, in some years sharply reduce its sowing qualities.



3. Absence of normative-legal acts on regulation of recreational and pasture loads on the forest ecosystem.



Livestock density



Livestock density in forest conditions

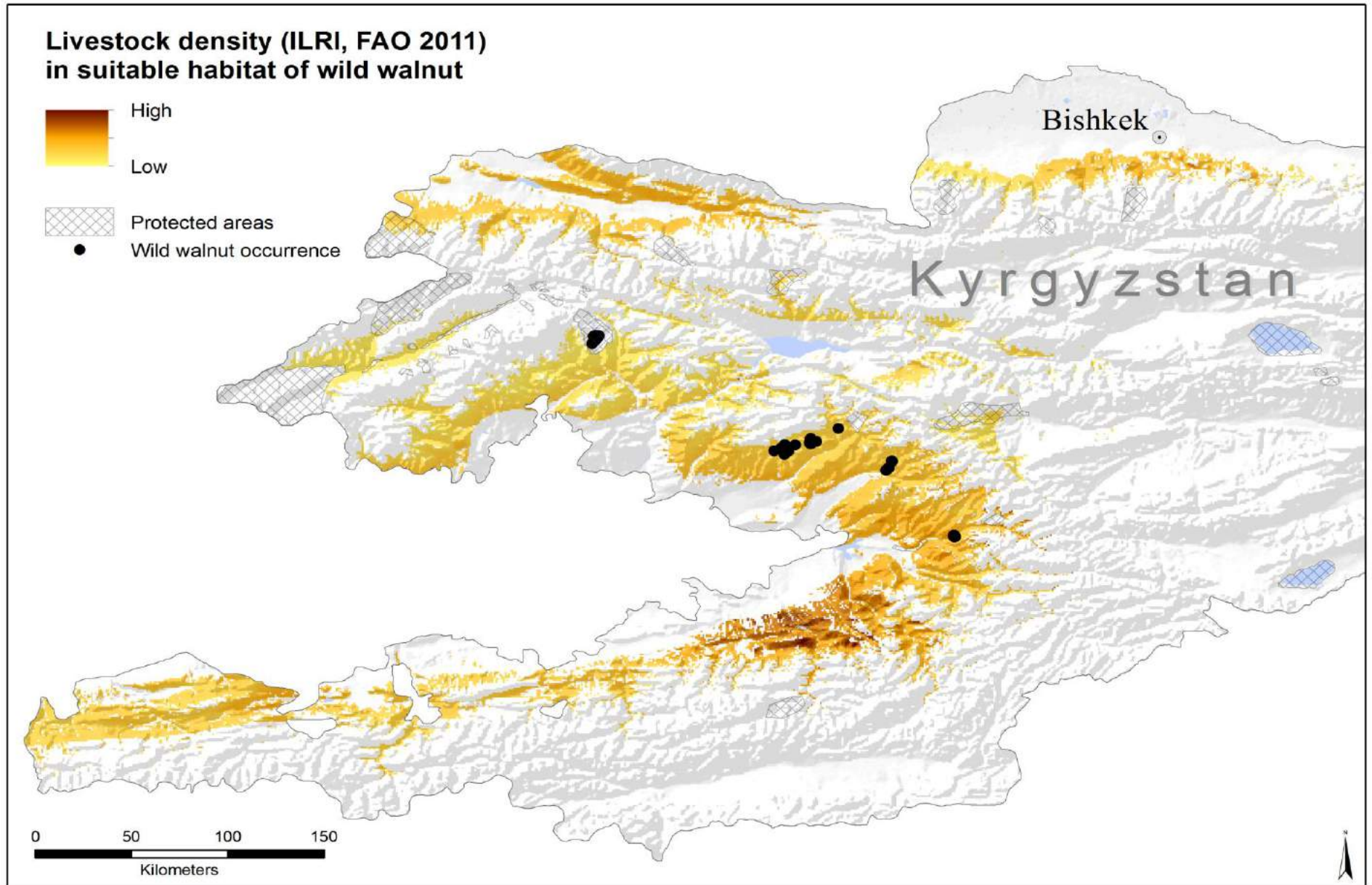




фото Д.А. Милько

б.р. Талды-Булак (хр. Кыргыз Ала-Тоо, Чуйская обл).

4. It is necessary to conduct meteorological observations, as well as to study the role of forests in regulating the internal flow of water under the influence of forest plantations.



DIRECT DESTRUCTION OF TUGAI FORESTS



фото Д.А. Милько

б.р. Чанач (хр. Чаткал, Жалалабатсая обл).

DIRECT DESTRUCTION OF MOJEVELO FOREST



б.р. Касан-Сай (хр. Чаткал, ДЖ обл).

DIRECT DESTRUCTION OF THE SPRUCE FOREST

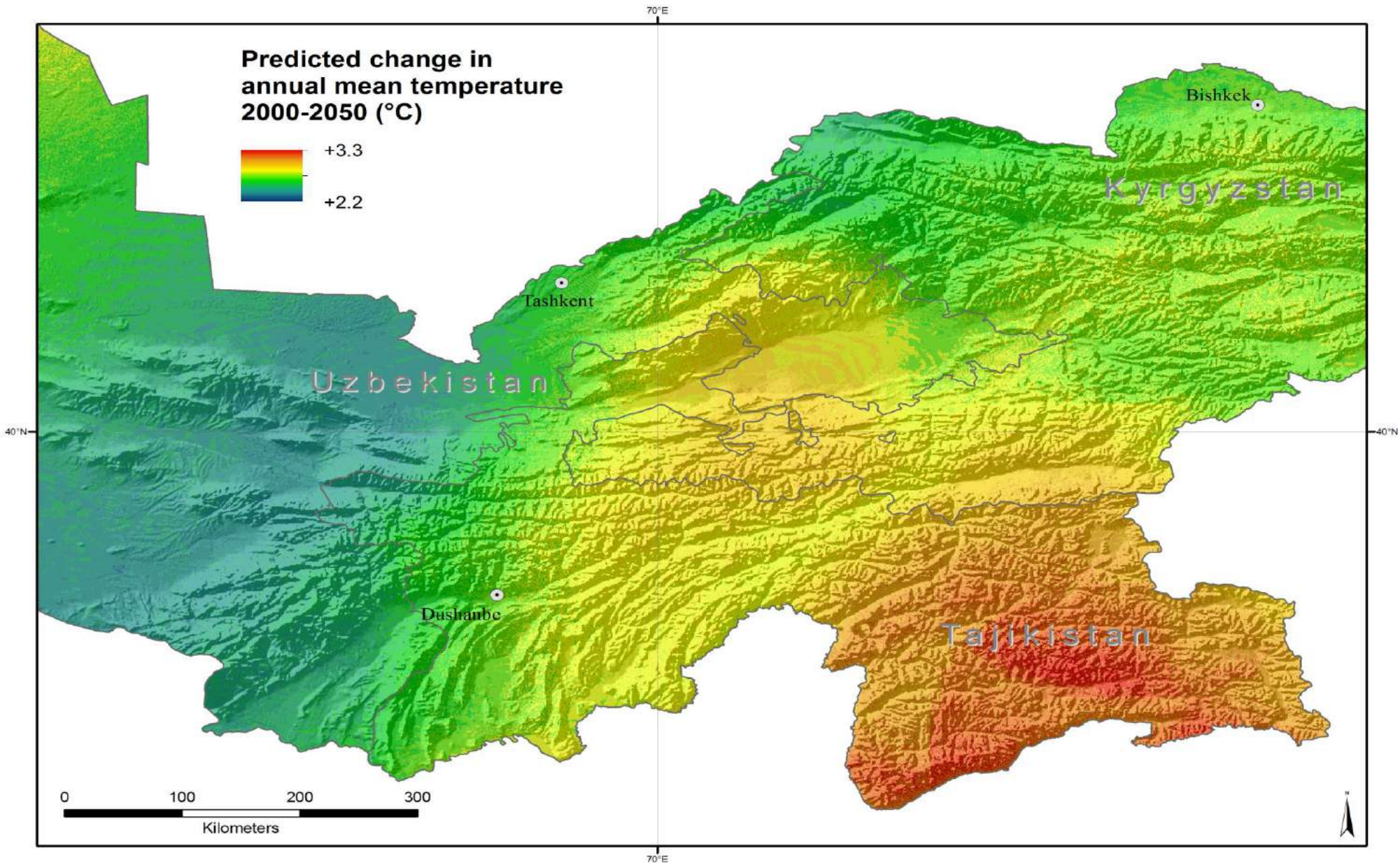


DIRECT DESTRUCTION OF GLACIERS

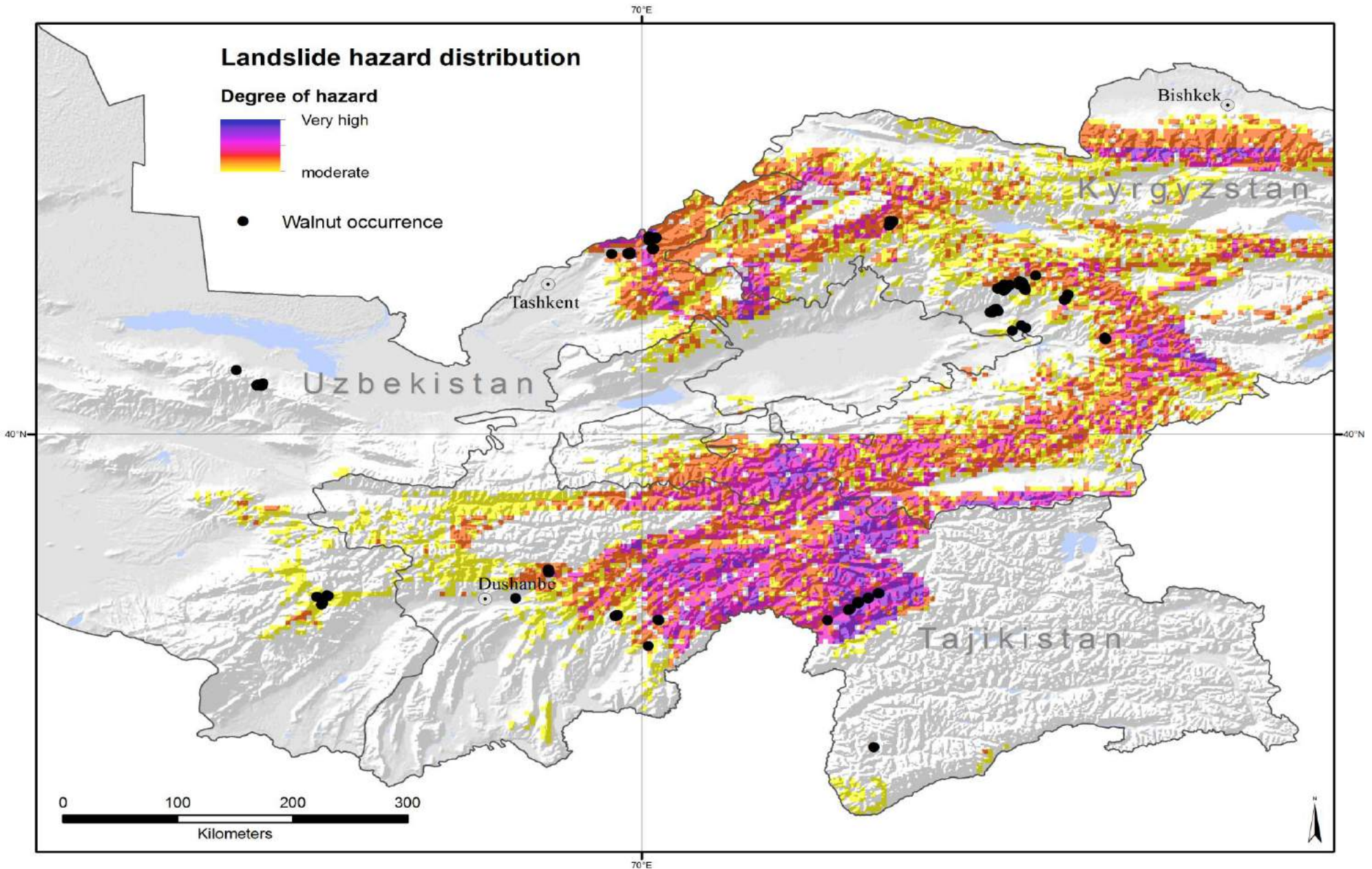


б.р. Кумтор (хр. Ак-Шийрак ИК обл.)

Projected temperature change



Landslide hazard distribution





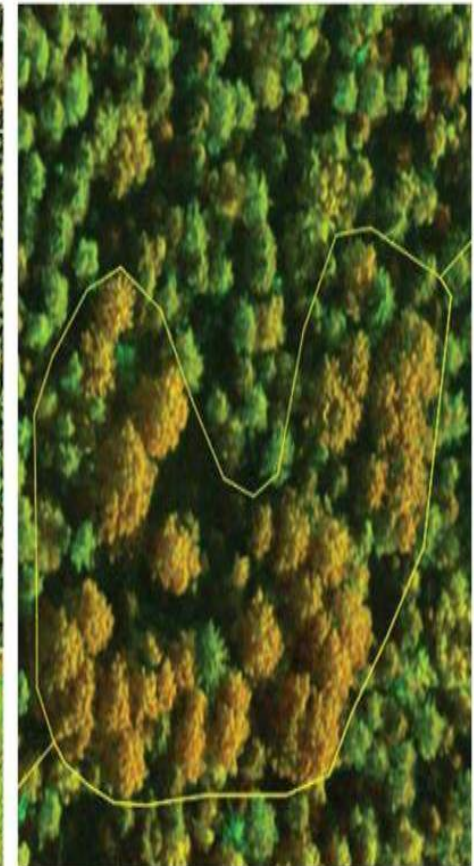
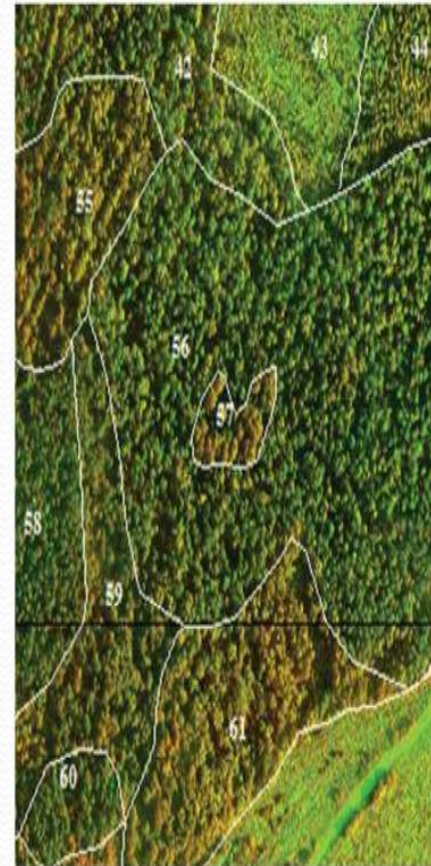
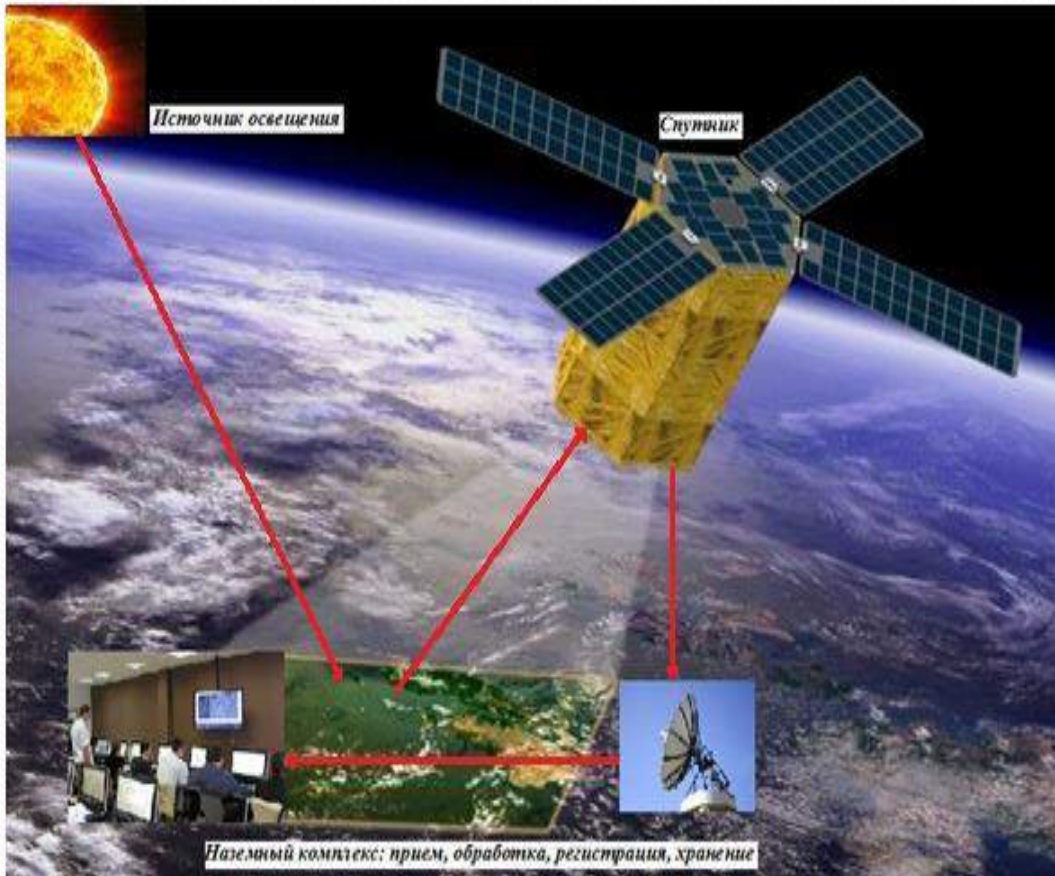


**Main scientific research potentials for the conservation and
increase of forest cover in Kyrgyzstan**

IT'S NECESSARY

Taking into account the growing attention of the entire world community to the functions of forests, it is necessary to conduct further research on all functions of forests in order to clarify their economic assessment and contribution to the country's economy.

1. On the basis of scientific research, create a database on the state of forests by accessing satellite data of medium and high spatial resolution in the optical range for interpretation. The dynamics of their growth and recovery, as well as the monitoring of foci that threaten the healthy development of the forest.



2. Creation of Smart - greenhouses using alternative sources.

The scientific potential will expand knowledge and observations about rare and endangered species, as well as find a solution for growing plants that are listed in the Red Book (Semenov fir (*Abies semenovii*), Nedzwiecsky apple (*Malus niedzwetzkyana*), Korzhinsky pear (*Pyrus korshinskyi*), pear Central Asia (*Pyrus asiae-mediae*, *Pyrus sinensis* subsp. *asiae-mediae*), Knorrington hawthorn (*Crataegus knorringtoniana* Pojark), etc.)



3. The creation of scientific forest seed plantations is the main object of forest breeding seed production. This will allow, for a long time, to massively obtain seeds valuable in terms of hereditary properties and to carry out a safe collection of fruits and cones.



4. Creation of a seed bank from trees and shrubs, which will allow to study endemics with a scientific approach and preserve rare endangered plant species.



5. Ways to promote natural reforestation using drones can create accurate three-dimensional terrain models that will allow for initial soil analysis. The results of such an analysis can be used in planning a seed planting scheme.

Unmanned aerial vehicles can also be used for spraying plantings. This not only improves spraying efficiency, but also reduces the amount of excess chemicals entering the soil.





**Спасибо за внимание !
Thank you for your attention!!**

