



Food and Agriculture  
Organization of the  
United Nations

# DIALOGUE

#10

## FAO-GEF project

Integrated natural resources management in drought-prone  
and salt-affected agricultural production landscapes in  
Central Asia and Turkey (CACILM-2)



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INVESTING IN OUR PLANET

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Project Steering Committee was held in Antalya (Turkiye).

## Outputs of activities in the countries of Central Asia

Steering Committee members, representing government agencies responsible for the development of the agricultural sectors, as well as for country actions against desertification in the context of climate change in the region of Central Asia and Turkiye, noted that the project fully met the expectations and coped with its tasks.

In the highly constrained environment of the Covid-19 pandemic, activities were not halted for a single day in any of the countries. Moreover, during the period of lockdown and “remote work”, partnerships with government natural resource management agencies, research institutes and a number of other partner organizations in all countries of the region were significantly strengthened.

The project successfully accomplished emerging non-typical tasks, including emergency assistance to farmers facing

constraints and at risk in Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan.

The training of thousands of farmers and agricultural specialists in modern techniques and approaches for effective and rational use of land, water, and pasture resources, with the involvement of internationally renowned experts, has been ongoing in the remote access format.

Over the course of five years, proven technologies for cultivating drought-resistant crops and reducing soil salinity have been introduced on thousands of hectares of saline and arid farmland in all participating countries; plans have been developed and continue to be implemented for the effective management of the most valuable natural resource – pastures, the productivity and condition of which the well-being of millions of people in the region depends on.

Training manuals, guides and other visual materials on the transition to rational technologies promoting economical use of dwindling water resources have been developed and widely disseminated, including through the transition to indoor crop cultivation using drip irrigation systems.

“During the implementation of this project, which is unique in scale and scope, we have managed to gain excellent experience in the field of climate change adaptation measures,” Derya Polat Kose, National Project Coordinator in Turkiye, Head of Department of the General Directorate of Turkiye for Combating Desertification and Erosion noted in her welcoming remarks.

“Governments, with the support of the project, developed, approved and launched national programs to combat desertification. Legislative bodies of the countries of the region continue to amend laws and codes governing forest management, water and land resources in the face of climate change,” she emphasized.

As noted at the meeting by Murat Temirzhanov, a member of the Steering Committee, Chairman of the Land Resources Management Committee and Chief State Inspector for Land Use and Protection of the Republic of Kazakhstan, one of the most important achievements of the project in Kazakhstan is the decision of the Government of the Republic of Kazakhstan to establish GIPROZem in the country (State Institute for Land Survey Work). More importantly, the President of Kazakhstan, Kassym-Jomart Tokayev, has instructed the dissemination of successful pasture management practices of the pilot area in Karaganda oblast throughout the country.

As stated by Muhammet Durikov, SC Member, Head of the Research Center of the Interstate Commission for Sustainable Development of Turkmenistan, with the Project assistance the national program to combat desertification and achieve land degradation neutrality is being successfully implemented in the country, and trained specialists work effectively with GIS maps.



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Among the project's notable accomplishments is the government of Kyrgyzstan's decision to allocate budgetary funds and attract additional resources from external sources for the widespread installation of remote freshwater sensors. Additionally, the government has expressed support for the industrial production of hydraulic rams and artificial glaciers, which will facilitate the dissemination of all advanced agricultural practices promoted by the project in Kyrgyzstan.

Following Kazakhstan, in Uzbekistan, trained and "armed" with specialized instruments and visual aids, "soil doctors" are starting to work, and more and more farmers are adopting no-till technologies – plowless cultivation

of farmland in arid regions – to preserve moisture and biota in the soil and reduce soil degradation, increase crop yields and improve farmers' livelihoods.

As observed by Makhmud Shaumarov, Regional Project Coordinator, the seeds planted by the project are already bearing fruit. Furthermore, acknowledgement of the project's merits signifies the continuation of its initiatives in the region.

In light of the outcomes of the CACILM-2 Steering Committee meeting, a decision was made to approve the activity plans and budget until the end of 2024.





## Climate change is impossible to stop, yet drought can be controlled

**A three-day International Workshop “Planning for Integrated Drought Management in Central Asia” was held in Istanbul, Turkiye.**

Drought knows no bounds and cannot be avoided or halted. However, with advent of sophisticated technology, it is possible to predict the phenomenon and therefore allow farmers to prepare.

«With the application of knowledge, the implementation of sectoral policies, and the utilization of appropriate response strategies, the impact of this environmental phenomenon can be significantly mitigated,» state the world’s foremost experts on drought.

Central Asia is one of the regions with a high risk and vulnerability to drought, which consequently represents a threat to food security. It has been demonstrated that in excess of 70% of the damage caused by drought affects the agricultural sector.

Concurrently, 58% of Central Asian region’s population resides in rural areas. Agricultural production contributes between 10% to 38% to GDP and between 18% to 65% to the region’s employment.

“The ominous nature of droughts and their far-reaching consequences require careful planning that takes into account the multifaceted nature of this natural phenomenon, which is primarily caused by climate change,” Maher Salman, the FAO lead water and land officer, observed at the workshop. “These plans should reflect a paradigm shift to proactive risk management capable of adapting to ever-changing environmental conditions,” he stated.

From 2000 to 2016, the economic losses incurred by CA as a result of droughts exceeded



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2 billion U.S. dollars. As indicated by the Intergovernmental Panel on Climate Change, the phenomenon of climate change is already resulting in an increase in the frequency, intensity, and duration of droughts. This has a significant impact on the development of numerous economic sectors, including food production and electricity generation.

“Research by world-renowned scientists shows that the cost of inaction in this area in the near future will be 10 times higher than the cost of action today, i.e. one dollar invested today in landscape restoration and drought risk management programs will save 10 dollars in the future, - stated Makhmud Shaumarov, Regional Project Coordinator.

To ensure the resilience of agricultural sectors and mitigate the adverse effects of severe drought, countries need to enhance the implementation of agricultural technologies that improve water use efficiency, maintain soil moisture, help transition to drought- and salinity-adapted crops, and safeguard ecosystems.

Securing adequate financing, including through the mobilization of foreign investment is critical. Similarly, the provision of human and technical resources to implement drought management plans and ensure their sustainability plays a crucial role.

“We must act urgently and collectively to reduce risks and strengthen the resilience of our communities and countries to drought,” noted Viorel Gutu, FAO Sub-regional Coordinator and Resident Representative in Turkiye. “An integrated approach, encompassing scientific evidence, early warning systems, preparedness, mitigation strategies, response and recovery technologies is essential for ensuring sustainable food security for the people of the region,” he said.

With the assistance of the project, the workshop was attended by the representatives of government agencies responsible for natural resource management and technical experts from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkiye and Uzbekistan, as well as international experts on drought, combating desertification and sustainable use of natural resources from the FAO, the UN Convention to Combat Desertification, the European Union and other international and regional organizations.

The expertise and hands-on skills acquired during the event will inform the development of national drought management plans and contribute to the implementation of the UN Convention to Combat Desertification.

**Kazakhstan**







## To switch from rice to sorghum: Field Day in Kyzylorda

The Field Day, held in the Kyzylorda region, was entitled «Introduction of Salt-Tolerant Crops into Rice Systems, with a Focus on Sugar Sorghum Cultivation.»

Kyzylorda region is the main rice-producing region in Kazakhstan, with nearly half of its 195 thousand hectares of irrigated arable land dedicated to rice cultivation. Despite its status as one of the most productive agricultural regions in the country, the region faces persistent challenges related to irrigation water scarcity and soil salinization.

As indicated by the salinity map compiled in 2021 by CACILM-2 project specialists in collaboration with Kazakh partners, approximately 85% (20.3 million hectares) of the region's arable land is affected by varying degrees of salinization.

As noted by Prof. Maria Ibraeva, Head of the Soil Fertility and Agrochemistry Department of the O. Ospanov Kazakh Soil Research Institute, almost whole irrigated arable land in Kyzylorda region loses humus in the soil, leading to a drop in the crop yields.

The professor highlighted that many plants adapted to the southern Kazakhstan climate are capable of rehabilitating eroded soils. Such species include sandy safflower, oriental goat's rue, alfalfa and clover, which enrich the soil with nitrogen and contribute to the formation of humus.

Furthermore, perennial legumes have a powerful and widely branched root system, which protects soil particles from leaching and weathering. A promising bio-meliorative agent for the effective development of saline irrigated lands is also licorice, a valuable medicinal and fodder crop. Green crops - rapeseed, mustard, sweet clover and millet also enrich the soil with organic matter and reduce the degree of erosion.

The project has been operational in Kazakhstan since 2018, with the objective of promoting effective agricultural practices to facilitate the restoration of soil fertility. Through agreements with Kazakh research institutes and close partnerships with public administrations, a gradual diversification of crops is being carried out in the pilot regions.



This signifies a transition from the cultivation of rice, an extremely water-intensive crop, to the introduction of drought- and salt-tolerant varieties in rice farms within the Kyzylorda region. These alternative crops have the potential to mitigate salinity, enhance land fertility and bolster the economic situation on farms.

The project also facilitates research, including cost-benefit analyses of conservation practices

in agriculture. One such study, conducted in 2022 in Kyzylorda, demonstrated that cultivation of salt- and drought-tolerant sugar sorghum on depleted soils yields a profit that is one and a half times greater for farmers.

The Field Day was attended by project partners in Kyzylorda region, including representatives of the scientific community, local authorities and farmer households.



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**Kyrgyzstan**





## Dissemination of successful project practices throughout the country: irrigation water control system, artificial glaciers, hydraulic ram

The government of Kyrgyzstan has decided on a large-scale transition to automation of the irrigation water metering systems. Sensors will be installed at 72 gauging stations in the Chui region, which will serve 30 thousand hectares of irrigated land, noted the head of the Irrigation Research Institute of the Kyrgyz Republic Ulan Chortombayev. According to him, 72 water level sensors and protected devices will allow data on water consumption to be transmitted over long distances.

“Currently, 32 sensors have already been installed, which serve 15 thousand hectares on the Kegety and Shamsi river systems. Work is also underway to prepare the remaining 40 gauging stations for the installation of electronic devices with antennas and electronic protective mechanisms,” he noted.

Despite the abundance of water resources (approximately 50.0 sq. km per year), Kyrgyzstan periodically experiences water shortages for agriculture, energy and drinking needs, and due to irrational use and pollution of water resources, degradation of river ecosystems and reduction of hydrobiological diversity of water bodies are observed.

The main reason for water shortages is inappropriate water resource management, and imperfect water distribution systems and water accounting facilities. The Water Resources Service operates 3,236 gauging stations, most of which are not functioning reliably, and the system for obtaining operational information on the volume of water for irrigation requires radical improvement.





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To mitigate the negative effects of water scarcity, the project, with the support of the government and in collaboration with scientists from the Institute of Irrigation, developed an effective solution for metering water released to fields.

In the pilot Kochkor district, ultrasonic sensors were installed at six hydrological posts three years ago under the project. In the meantime, local water user associations received computer equipment with an installed irrigation water metering program, and users were trained on how to utilize this program.

In addition, the Kochkor District Water Management Department was furnished with the requisite equipment and software, and specialists underwent training in the utilization of real-time data from hydrological posts.

As a result, modern digital technologies have facilitated not only the rational distribution of water in the area, but also the elimination of the ground for conflict between farmers

over a vital natural resource. Thanks to these measures, water-related disputes in this area have been eradicated, and water management department's specialists have been dispatched to Kochkor from neighboring areas for experience.

Sensors emit ultrasonic pulses that are reflected from the water surface; special equipment records this information, which is then transmitted to a computer. Thus, the system allows receiving real-time data on the water level in the canals.

This also greatly facilitated the work of specialists who had to travel hundreds of kilometers across the area every day to manually measure the water volume in irrigation networks. Moreover, the expenses incurred by the Water Management Department for fuel and travel by its employees were significantly reduced.

“Thanks to the automated metering system, we know exactly where, when and how much water is consumed. Besides that, we can see



the total water consumption for a month or a quarter, says Vitaly Shablovsky, the inventor of this unique system. — Previously, such data was collected manually at special measuring stations. But what happened between checks was unknown. Water could have been under-delivered, cut off, and so on.”

The physical principles used by scientists from Kyrgyzstan are well known, but the device they invented turned out to be several times cheaper than imported analogues. According to Vitaly Shablovsky, the use of this system in low-water conditions will provide an unbiased accounting of water consumption and will help farmers develop a careful attitude towards dwindling water resources.

“It’s not so important for a farmer how much water is in a river or canal, he cares about how much water he will get to irrigate his field,” says Vitaly Shablovsky. “But in order to calculate the water balance, all gauging stations must be equipped with sensors. Only a systematic approach will ensure the expected result.”

The experience gained from using the device in the pilot areas is already being disseminated throughout the country. It is important that this initiative is actively supported by the Government of Kyrgyzstan. Currently, an inventory of main water canals and hydraulic structures where water meters are to be installed is underway.

In 2024, the project provided policy recommendations to the Government of Kyrgyzstan on the automation of remote water metering systems in water basins throughout the country. All these documents were coordinated with relevant government agencies, NGOs and experts in the field of water resource management. In 2023, they were presented at the Scientific and Practical Conference “Science and Innovation Days” as part of the FAO Science and Innovation Forum in Budapest. In Kyrgyzstan, such a discussion also took place in 2023 within the framework of the Scientific and Practical Conference, organized jointly by the Ministry of Agriculture and the Kyrgyz National Agrarian University.



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«We are engaged in close collaboration with the Ministry of Agriculture of the Kyrgyz Republic, scientific institutions and numerous national partners, local authorities and pasture committees with the objective of facilitating farmers' transition to sustainable approaches in natural resource management,” stated Mahmud Shaumarov, CACILM-2 Regional Coordinator. «With the support of the project, inter-institutional cooperation in the pasture and water use sectors is strengthened, innovative, unique and effective digital technologies are being introduced and the capacity of water user associations and specialists from government agencies for water resource management in the country is being built,” he noted.

In 2023, 935.6 million KGS (USD 10.4 million) were allocated from the national budget in Kyrgyzstan for repair and restoration work at public water facilities.

In 2024, the budgetary allocation of 2.2 billion som is earmarked for the concretization of almost 650 km of watercourses and cleaning 223 km of collector-drainage networks. Daily regulation pools will also be renovated.

According to the Kyrgyz Research Institute of Irrigation, after installing sensors all over the country, the efficiency of irrigation water use will increase by 50%.

# Turkmenistan

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## The laser leveler received from the project by Dashoguz local administration promotes the efficient use of irrigation water and prevention of soil salinization

The farmers' association "Andalyp" in the Akdepe etrap of Dashoguz velayat received the latest equipment – a laser soil leveler.

Laser leveling is a modern technology for leveling the ground using special equipment (laser installation), when the difference in unevenness on the field surface does not exceed 1-3 cm.

«Under irrigated farming conditions, a flat soil surface ensures the efficient use of fertilizer, water and energy resources, which ensures a stable and high crop yield,” said Dessan Isgenderov, Chairman of the Andalyp Farmers’ Association, at the equipment handover ceremony.

After leveling the soil surface using this equipment (without disturbing the natural slope of the site), irrigation water will be evenly distributed over the entire surface of the field. Together, this will dramatically reduce the risks of water erosion and waterlogging.

Application of this technology leads to savings of irrigation water by an average of a quarter of the consumed volumes, an increase in water use efficiency by at least one third, reduction of soil salinity level, and a reduction in the time

allotted for watering land. In addition, uniform germination of crops is observed, uniform nutrition and hydration of crops is ensured, weed growth is reduced, and the yield increases by 30% to 40%.

«In addition to the well-known advantages that a laser leveler has, primarily the efficient use of water resources and the prevention of degradation of fertile soil, this modern equipment also allows increasing labor productivity, reducing tillage time and fuel costs, said Mahmud Shaumarov, Regional Coordinator of the Project, under which the equipment was delivered.

In addition to the laser leveler, the partners in Turkmenistan have already received a number of agricultural machinery and equipment from the project, including three 25 hp four-wheel drive tractors, three four-row seeders, a no-till seeder for crop sowing and 15 two-wheeled motorized blocks for organizing agro-technical activities.

“Andalyp” Farmers’ Association of the Akdepe etrap of Dashoguz velayat is a pilot farm of the CACILM-2 project in Turkmenistan along with the Yerbent FA in the Central Karakum and the Nokhur mountain district of the Ahal velayat.



## A comprehensive analysis of the disaster risk reduction system in Turkmenistan's agricultural sector will facilitate the prevention of damages

A comprehensive analysis of the disaster risk reduction system in Turkmenistan's agriculture was presented.

The country of Turkmenistan is prone to a range of natural disasters, including droughts, floods, mudflows, hurricanes, sand and dust storms, invasion of cold and hot air masses, forest fires, earthquakes and zoonotic diseases. These disasters are the results of the unique characteristics of the landscape and soil-climatic factors present in the country.

Experts estimate that up to 70 percent of damage from any natural disaster occurs in the agricultural sector.

Agriculture plays an important role in Turkmenistan's economy, accounting for 12.4 percent of the country's GDP. In 2021,

total agricultural output amounted to USD 7.2 billion, of which USD 4.1 billion (or 56.8 percent of total output) was contributed by livestock production and USD 3.1 billion (or 43.2 percent) by crop production.

Furthermore, 52.9 percent of the country's population lives in rural areas and the agricultural sector employs about 43.7 percent of the adult population. Consequently, making the assessment of risk mitigation systems in the sector represents a primary focus of the FAO and GEF support programs.

Turkmenistan's national disaster risk reduction legislation explicitly recognizes and classifies a range of natural hazards, including those impacting the agricultural sector. However, the system designed to address and mitigate these risks is not yet fully developed.





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While the Ministry of Agriculture and the Ministry of Environment Protection are authorized to monitor meteorological, hydrological and geological hazards, and are also responsible for monitoring environmental and biological hazards, there is currently no sustainable system for responding to natural disasters, particularly drought. The legal framework does not yet define the disaster response measures and standard procedures.

Therefore, a group of Turkmen experts, supported by the regional and international FAO specialists engaged in document development, put forth a series of recommendations. These included the

incorporation of disaster risk reduction systems in the agricultural sector's short-term and long-term plans, policies and strategies, the implementation of the Law on "Insurance", further improving the hydrometeorological service and early warning systems, creating a mechanism for timely informing the population about the likelihood of natural disaster threats, as well as a number of other recommendations that will strengthen the risk reduction system and prevent damage caused by various disasters to the country's agriculture .

The analysis was conducted with the support of the CACILM-2 project.



## Project provided water intake pumps for agricultural producers in Dashoguz and Ahal districts will enable them cultivate more crops on previously abandoned lands and supply water to remote pastures

One of the primary objectives of the project is to disseminate best practices in effective and environmentally friendly management of natural resources. The supply of modern equipment for agricultural producers of Turkmenistan, carried out with financial and technical support of the Project in close cooperation with the Ministry of Agriculture and local government authorities, is intended to address this challenge.

The FAO has provided nine centrifugal horizontal water intake pumps to farmers in Dashoguz and Ahal velayats. The five pumps will facilitate the water delivery from the Karakum River through the main water supply system in the Central Karakum, while the remaining four will provide life-giving moisture to remote areas of farmers' households during periods of low precipitation.

With the help of these pumps, water will be uninterruptedly supplied to the fields of the Andalyp district in the Akdepe etrap of the Dashoguz velayat, to the remote villages and pastures of the Yerbent Farmers' Association of the Ak Bugday etrap of the Ahal velayat, as well as to the water pipelines of the Mary, Lebap, Balkan and Dashoguz velayats and to 6 livestock farms. In general, residents of villages and settlements in the desert area of the Central Karakum will

have access to sufficient water for domestic and agricultural needs, as well as for the watering of animals.

The uninterrupted and sustainable delivery of irrigation and drinking water using mobile pumps will assist local communities in addressing the urgent issue of irrigation water scarcity in remote areas of farms. Furthermore, it will contribute to the enhancement of pasture and livestock productivity, and the improvement of the socio-economic conditions of livestock breeders, farmers and their families. The project will also continue to train specialists and the population in the rational use of water resources.

According to the Regional Project Coordinator Makhmud Shaumarov, "in the region where agriculture is a significant contributor to food security, the preservation and effective use of natural, and above all, water and land resources is vitally important".

The fruitful collaboration with national partners within the framework of the Project has facilitated the pursuit and implementation of cutting-edge and effective technological solutions in addressing a number of complex challenges in natural resources and agricultural management.





## Two new tree nurseries built in Turkmenistan

In close cooperation with the Ministry of Environmental Protection of Turkmenistan, the project completed the development of two tree nurseries in the Kopetdag State Reserve: one in the Kopetdag Mountains (2 hectares), and the other one in the oasis zone adjacent to the Karakum Desert in the “Gyavers” section (1 hectare). The project purchased all necessary equipment and inventory for tree nurseries.

Among the main objectives of the nursery in the Kopetdag Mountains is the expansion of agroforestry areas, including an increase in the areas of nut, berry and fruit orchards - pistachio, almond, hawthorn, blackberry, and cherry.

Moreover, the nursery will supply communities with planting material of juniper, plane tree, dagdan, thuja and other crops for the restoration of forest plantations on the degraded slopes of the Central Kopetdag and the territory of the Bakcha picket, 50 kilometers from Gokdepe.

The nursery in the oasis zone will engage in cultivation of seedlings of fruit, deciduous and ornamental trees, as well as desert shrubs and semi-shrubs for the development of focal gardening, the formation of forest belts around irrigated fields, landscaping of populated areas,

as well as the expansion of desert forest areas in the Central Karakum.

“In close cooperation with the Government of Turkmenistan, we strive to implement in the country the best experience accumulated in the world in afforestation in desert and semi-desert zones,” said Mahmud Shaumarov, Regional Project Coordinator. “All this contributes to a stable increase in the production of berries, fruits and nuts, as well as an increase in the incomes of local tenants, gardeners and farmers and improving microclimatic and environmental conditions for local communities”.

Besides that, the expansion of forest areas in mountainous conditions will significantly reduce the impact of water erosion processes, particularly the occurrence of dangerous mudflows. In arid environments, expanding the planting of desert vegetation helps to increase the productivity of desert pastures, and, accordingly, the livelihoods of farmers.

Forest nurseries can serve as effective training grounds for local communities within the framework of Farmer Field Schools. The experience gained in growing fruit trees as well as adapted mountain and desert vegetation can be widely disseminated in Turkmenistan.



## Development of land management in Turkmenistan: training workshops on land management technologies

CACILM-2 experts actively participated in a five-day UNDP hands-on training on the use of the Global Navigation Satellite System (GNSS) to improve land management, including agricultural land.

The principal objective of the training was to equip specialists of the Land Service of Turkmenistan in all velayats with the skills and knowledge required to utilize modern land measurement tools. It is expected that the newly acquired knowledge will facilitate improvements to the country's cadastral registration system, which will ultimately contribute to combatting desertification and achieving neutrality of land degradation.

At the initial phase of the training, the international experts familiarized local Land Service specialists with the basic principles of GNSS operation, including the current and

expected capabilities of GNSS stations around the world. The training was followed by a practical session, during which the specialists installed, configured and maintained GNSS receivers, and made area and volume measurements, as well as automated point measurements with their respective parameters.

Alexander Dianov, the international coordinator of the training, defined "The global navigation satellite system as a system designed to determine the geographic coordinates of ground, water and air objects, as well as low-orbit spacecraft. The deployment of GNSS technology has the potential to facilitate enhanced land management practices, by providing farmers with precise positioning and data collection capabilities, allowing them to improve land management, optimize farming operations, increase productivity and promote environmental sustainability".







## Sustainable management of pasture resources – the basis for the well-being of villagers: workshop in Ashgabat

Project experts contributed to the UNDP workshop on sustainable pasture management. During the course of the workshop, participants engaged in discussion concerning the importance of geobotanical surveys in a comprehensive inventory of pastures. Additionally, the role of specially protected natural areas (SPNA) and types of possible agricultural activities that may be undertaken in the buffer zones of SPNA were considered. Also, the methods of pasture assessment using modern technologies were explored.

The participants were acquainted with the legislative framework in the field of management and regulation of pasture resources of Turkmenistan. Besides, the concept developed by the project for the introduction of rational pasture rotation on a pilot plot in the Ruhubelent etrap was presented and discussed at the workshop.

The workshop featured presentations by experts from the Kaplankyr State Nature Reserve, the National Institute of Flora and Fauna, and specialists from the CACILM-2 and the Aral projects.

Also, the representatives of the State Committee for Water Management of Turkmenistan, the Khyakimlik of the Dashoguz velayat, the Khyakimliks of the Ruhubelent and S. Turkmenbashi etraps, the “Dovardarchylyk” Livestock Farm, the “Dashoguzorisuv” Repair and Construction Enterprise, the NGO “Eco-Durmush”, as well as farmers-livestock breeders of the etraps S. Turkmenbashi and Ruhubelent took part in the workshop.





**“It is unfeasible to establish a garden city in the desert. However, it is both feasible and necessary to transform the desert into a productive pasture”**

- Sultan Veysov, CACILM-2 project consultant

Sultan Veysov is the author of the course on rational management of natural pastures in desert conditions, which has been taught at the Magtymguly Turkmen State University.

Among other elements of sustainable management of the country's critical natural resource, the new 56-hour course includes such relevant topics as the current state of natural pastures of Turkmenistan, features of transhumance livestock farming in the country, existing environmental and climatic conditions in the territory of natural pastures of Turkmenistan, as well as various issues of natural pasture use.

“We all in Turkmenistan are acutely aware of the phenomenon of climate change”, says Sultan Kerimovich. “Droughts are not uncommon here, however, the most recent episode was unusual even for us. The severe drought has

lasted since 2017 and intensified every year, exerting detrimental impact on the surrounding environment. It is only in 2024 that the relative norm of precipitation fell for the first time in seven years.

Taking into account the fact that there is no practice of stall feeding of livestock in the country and 84% of the country's total land area (41.5 million hectares) is occupied by year-round pasture lands, it is becoming increasingly clear that without the practical conservation and effective natural resource management technologies, farmers' livelihoods in climate change is at risk.

In conditions where precipitation is sharply decreasing and, accordingly, the pasture productivity is failing, there is an urgent need for transition to sustainable use of available natural resources.





It was these factors that made me sit down to develop this course for young professionals in the field of ecology. This course is intended for senior undergraduate environmental science students.

After graduation, some of them will be engaged in scientific research, some will teach, but most of them will be practically dealing with desertification control, as well as preserving and restoring pasture resources and reversing the processes of degradation of desert pastures.”

Holder of honors degree from Magtymguly Turkmen State University, leading researcher at the National Institute of Deserts, Flora and Fauna of the State Committee for the Protection of the Environment and Land Resources of Turkmenistan (currently the Ministry of Environmental Protection of Turkmenistan), Candidate of Geographical Sciences Sultan Veysov has been working in the field of natural resource protection for 44 years. He is the author of more than 120 scientific papers.

“It is essential to maintain harmonious relationships with the delicate desert ecosystem, and the Gumlys, the population living in the Karakum Desert, know this very well”, says the scientist. “And lately, we have been talking more often about careful and competent use of the natural resources that are available in Turkmenistan. The National Institute of Deserts, Flora and Fauna has a huge amount of research, important and necessary information to support the Karakum ecosystem. At the same time, all practical recommendations have a scientific basis and the project provides invaluable assistance in this regard”.

In his capacity as a consultant to FAO and GEF, Sultan Veysov is responsible for developing and implementing best practices for sustainable natural resource management in the context of mounting challenges posed by drought. He is engaged in continuous collaboration with local communities, land users and farmers, helping them learn caring and efficient land use practices, assisting in disseminating effective technologies and approaches for restoring desert pastures, developing agroforestry in mountainous regions and improving the reclamation condition of irrigated lands based on the experience of FAO and the National Institute of Deserts, Flora and Fauna.

All CACILM-2 initiatives in Turkmenistan are accorded significant attention, therefore the proposal to introduce a course on sustainable utilization of natural pastures in arid conditions at a higher educational institution was met with considerable support and approval at all levels - both at the University itself and at the Ministry of Education of Turkmenistan.

“Moreover”, says Sultan Kerimovich, “we have already started teaching this course to our students, future environmental protection specialists. Also, the course is utilized when meetings and trainings are conducted for project partners in pilot areas, such as employees of local administrations, specialists and farmers”.

When asked about future plans, the scientist articulated his aspiration to pass on as much experience and knowledge as possible to the next generations as long as he has health and strength, so that a prudent and considerate approach towards natural resources in Turkmenistan will be preserved and transmitted across generations.

**Uzbekistan**







## The “Soil Doctors” program launched in the Bukhara province: one hundred farmers will be trained in sustainable key resource management

In collaboration with the Global Soil Partnership (GSP), the project launched the “Soil Doctors” program in Bukhara, through which one hundred farmers will learn how to properly manage land resources.

According to FAO, soil erosion and degradation pose a serious threat to the development of sustainable agriculture in Central Asia. It is noted that the launch of the “Soil Doctors” program is an important step to overcome these challenges.





An extensive four-day course for future trainers was held in the Bukhara province. Local specialists from relevant institutions, as well as farmers, were trained to implement sustainable soil management methods.

The curriculum included increasing soil organic matter, optimizing nutrient management and improving the agronomic properties of salinity-prone soils, as well as understanding soil pH, texture and structure.

«Farmers need to realize that the decisions they make when cultivating their small plots of land can have a significant impact on the

environment. It is necessary to consider soil as a valuable resource that must be protected. It is important to promote sustainable soil management methods and address the problems faced by farmers,” said National Project Manager Muhammadjon Kosimov.

With the support of the project and GSP, the initiative will be extended throughout the country. In total, it is planned to train one hundred farmer-leaders from Bukhara, Kashkadarya, Khorezm and other regions, who will pass on their knowledge to even more number of farmers in all parts of Uzbekistan.







## AquaCrop model for improving irrigation systems promoted in Uzbekistan

A training workshop was held in Bukhara on the implementation of the “AquaCrop” model for further optimization of agricultural irrigation.

The workshop was conducted by the international experts from the University of Cordoba (Spain), the Catholic University of Leuven (Belgium) and the Institute of Sustainable Agriculture (Spain).

The workshop was held for specialists from relevant ministries and departments of Uzbekistan, including staff of the Ministry of Agriculture and the Ministry of Water Resources of Uzbekistan, the International Water Resources Management Institute, Uzhydromet, as well as representatives of the “National Water Resources Management Project in Uzbekistan” of the Swiss Agency for Development and Cooperation.

On the agenda was the issue of incorporating natural and climatic factors into agricultural irrigation planning. For this, the program is proposed to use the so-called “AquaCrop” model, developed by the FAO Land and Water Division to ensure food security and assess the impact of environmental conditions and resource management on crop productivity. The program creates a computer simulation of plant growth based on soil and climatic factors, and allows you to calculate the required amount of irrigation water for maximum crop yield. Thus, AquaCrop predicts plant yield depending on water consumption, which is especially relevant in regions at risk of drought.

«FAO’s work on water issues focuses on more efficient and environmentally safe use of water in agriculture. We strive to ensure production without compromising water resources and the

health of the ecosystems that depend on them. The practical application of the “AquaCrop” model will increase land productivity with significant water savings, which meets the goals and objectives of our CACILM-2 project, aimed at supporting agricultural production in drought-prone regions,” said National Project Manager Muhammadjon Kosimov.

During the workshop, the features of irrigated agriculture in the Bukhara province were discussed, special attention was paid to the issues of growing cotton, wheat and alfalfa. Separate presentations were devoted to countering the risks of drought and salinity, improving irrigation technologies. The technical side of irrigation and watering, planning schemes for the operation of irrigation and collector-drainage systems, standards and accounting for water supply, as well as other topical issues were discussed. The workshop program also included field visits.

During the practical part of the workshop, the participants were able to test the “AquaCrop” model. Given the recommendations of international experts, the participants carried out electronic processing of data on temperature, precipitation, wind speed and other indicators, obtained data on the coefficient of moisture evaporation from soil and leaves, and then compiled irrigation regimes and yield forecasts on the example of some crops.

The implementation of affordable FAO water management solutions such as the “AquaCrop” model will help increase agricultural productivity in drought-prone regions without compromising the environment, saving water resources - the most valuable and important factor in rural livelihoods.



## The Southern Research Institute of Agriculture in Uzbekistan will demonstrate the best practices of rational use of irrigation water with the help of the modern equipment it has received

As part of the project, a modern sprinkler irrigation system was installed at the Kamashi branch of the Southern Research Institute of Agriculture (Uzbekistan) on an area of 10 hectares. This technology will allow saving from 30% to 50% of irrigation water.

It is known that the creation of new competitive varieties of agricultural crops with high quality indicators, resistant to diseases and pests, is one of the main activities of this research institute. In addition, the introduction of advanced resource-saving technologies to obtain high yields of agricultural crops in conditions of insufficient water supply and drought is important in the activities of the institute.

«Irrigation is one of the main factors in obtaining a guaranteed crop yield and, in turn,

high income in the conditions of Uzbekistan. In the face of climate change, especially water scarcity, rational and sustainable use of available water resources becomes important. Sprinkler irrigation technology can significantly save water resources. We hope that other farmers will also adopt this system, and in the future, with the introduction of such technologies in the region, the area will expand,” said the National Project Manager Muhammadjon Kosimov.

Earlier, under the project, farms and other organizations in the Kamashi district received a mobile seed cleaning plant, seeds of highly productive drought-resistant grains and oilseeds. All this is in order to promote seed production in rainfed areas in Kamashi.





## Tashkent State Agrarian University students will now have the opportunity to engage in soil and plant laboratory research

Promoting youth education, introducing advanced technologies and foreign experience into the educational process is one of the priorities of cooperation between the Food and Agriculture Organization of the United Nations (FAO) and the Tashkent State Agrarian University (TSAU). An important step in this direction was the transfer of laboratory equipment from FAO to the Department of Plant Growing, Soybeans and Oilseeds at TSAU for a total amount of about USD 17.5 thousand.

The kit includes a nuclear magnetic resonance spectrometer, a chlorophyll meter, soil moisture sensors, a refractometer and other instruments. The new equipment will be used for scientific and educational purposes.

In particular, students studying in the field of crop production will be able to get acquainted in practice with the features of plant analysis and determining their chemical composition and product quality indicators in the laboratory.

«New equipment will make it possible to determine with high accuracy the oil content of seeds, as well as the degree of chlorophyll and soil moisture, for further optimal application of mineral fertilizers. The results obtained will be reflected in research work on the creation of new drought-resistant varieties of agricultural crops, which is consistent with the goals of our CACILM-2 project. In addition, the use of technologies and methods developed by the university scientists will contribute to obtaining sustainable harvest in conditions of drought and salinity,” said CACILM-2 National Project Manager Muhammadjon Kosimov.

It was noted that cooperation between the university and FAO had been developing since Uzbekistan joined FAO in 2001 and especially intensified with the opening of the FAO Representative Office in Uzbekistan in 2014. During this period, many joint projects were implemented aimed at training highly qualified personnel for the agro-industrial sector in Uzbekistan based on advanced foreign experience.



## New GIS laboratory launched in Bukhara

The Bukhara Institute of Natural Resources Management at the National Research University

Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (Uzbekistan) hosted the opening ceremony of a new Geographic Information Systems (GIS) laboratory, established with the support of CACILM-2. The new GIS laboratory is equipped with the most modern computers, server, data center and plotter.

FAO staff made presentations at the event on the goals and objectives, as well as the significance of the new GIS laboratory, and spoke about the principles of their work. The Institute's research staff and other specialists were introduced to the capabilities of the new GIS laboratory, which is equipped with the latest technology.

«FAO advocates for improvement of the environment within agri-food systems, with a focus on the conservation of agricultural lands, forests, water resources and their sustainable use. Therefore, we believe it is very important to introduce advanced technologies to improve personnel training processes and conduct research work in this direction,» said National Project Manager Muhammadjon Kosimov.

The Bukhara Institute of Natural Resources Management was founded in 2004. The main goal of the educational institution is to train qualified personnel in the field of study and rational use of natural resources of Uzbekistan. The new GIS laboratory will be used for scientific, practical, educational and research purposes. Representatives of the institute expressed gratitude to FAO for the provision of a new facility, which opens up great opportunities for their activities.



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