Продовольственная и
сельскохозяйственная организация
Объединенных Наций

Dialogue

Newsletter # 8

FAO-GEF Project: Integrated natural resources management in drought-phone and salt-prone agricultural production landscapes in Central Asia and Turkey (CACILM2)"

Studies on disaster risk reduction in the agricultural sectors of four countries published on the FAO global web portal

Disasters are becoming more frequent and extensive worldwide. Natural disasters have already affected 4.03 billion people (an increase of 124% compared to the previous two decades) and resulted in direct economic losses of nearly USD 3 trillion (an increase of 182% compared to 1980-1999).

Meanwhile, climate change-induced natural disasters caused 91 percent of direct economic losses and impacted 3.6 billion people worldwide, the majority of those affected.

Agriculture accounted for 26% of the total impact of medium- and large-scale disasters in least developed countries and low- and middle-income countries from 2008 to 2018. Agriculture provides the livelihoods of 2.5 billion people; while it is also the sector that can ensure resilience to natural disasters and climate change.

FAO supports the consistent implementation of the Sendai Framework for Disaster Risk Reduction, the Paris Agreement, and the Sustainable Development Goals. FAO's efforts related to disaster risk reduction (DRR) policy and governance

include integrating these approaches into agricultural development planning processes, building capacity to monitor the impact of disasters in agriculture, and strengthening coherence between DRR and climate change adaptation processes.

The research examines the current state of the disaster warning and response system and provision of agrometeorological services in the agricultural sectors.

The scope of the study includes a review of national laws, policies, mechanisms, and services related to disaster response systems, assessment of gaps and needs, and recommendations to strengthen and improve the system performance.

The results of the country studies will inform the technical basis for the design and implementation of capacity development initiatives at the national level.

The research was supported by the project.

Similar reports on Turkmenistan and Turkey are being finalized and will soon be uploaded to the FAO resource as well.

Use these links to download the reports for free from the portal:

Report on Kazakhstan:

In English:

https://www.fao.org/publications/card/en/c/CB8757EN In

Russian:

https://www.fao.org/publications/card/en/c/CB8757RU

Report on Kyrgyzstan:

In English:

https://www.fao.org/publications/card/en/c/CB8418EN In

Russian:

https://www.fao.org/publications/card/en/c/CB8418RU

Report on Tajikistan

In English:

https://www.fao.org/publications/card/en/c/CB8435EN

In Russian:

https://www.fao.org/publications/card/en/c/CB8435RU

Report on Uzbekistan

In English:

https://www.fao.org/publications/card/en/c/CC1905EN

Project program meeting focusing on the project's impact on regional development and increasing its sustainability

Neither the pandemic nor the current chaos on the planet has had much impact on the implementation of our large-scale regional project aimed at reclaiming natural resources by introducing and disseminating successful resource-efficient agricultural practices on a broad scale.

On the contrary, the mandate of the project has never been more relevant and important, since food security is now more prominent than ever in all countries of the world, including Central Asia, and cannot be achieved without the sustainable use of natural resources with due consideration for climate change.

Nevertheless, the key program staff managed the project's activities remotely for all four years due to the severe restrictions associated with the coronavirus.

That is why the participants of the program meeting in Antalya shared their experience, successful practices, and impressive results in sustainable resource management with such enthusiasm and pride.

Successful field trials of the drought- and salt-tolerant alfalfa variety Emiliana were conducted in Bukhara province of Uzbekistan in addition to a wide range of activities. In 2020, the project provided the farm with only 200 kilograms of seeds that were difficult to find on the market. By the end of 2022, the region's farmers already have 22 tons of these seeds at their disposal.

Farmers' incomes are growing steadily because alfalfa is in high demand as wholesome fodder for livestock and the herbage can be mowed up to six times a year.

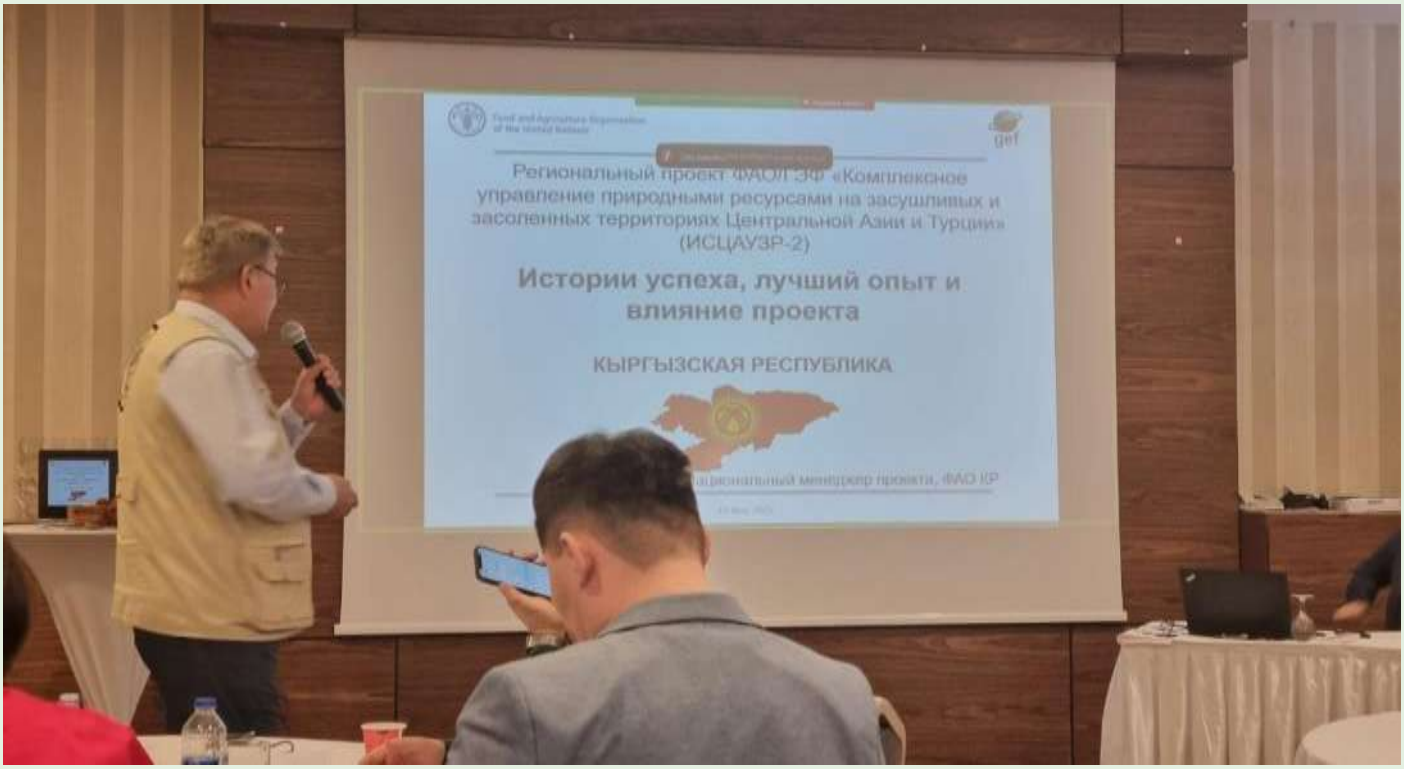
The income of the farm, which started to introduce this variety in the region, increased from 36 million soums in 2020 to 84 million in 2022. The areas under this crop are expanding too. From 100 hectares they have grown to 2000 by now and the demand for seeds continues to grow.

Project staff in Uzbekistan are also proud of the gender equality strategy developed and implemented by the project together with Agrarian University students.

Partners in Turkmenistan continue creating desert plant nurseries in pilot areas and building sardobas to collect rainfall and conserve water for farming. Modern greenhouses equipped with drip irrigation systems contribute to the application of efficient resource-saving agricultural technologies in practice, while the equipment and agricultural machinery purchased and transferred to national partners, including academic institutions, will help to cope more effectively with specific tasks in the field.

The area of agricultural lands in Tajikistan, where resource-saving technologies are applied, including the use of low-pressure water supply systems for drip irrigation, increased by 10 times, from 120 to 1,200 hectares. The farmers who have been involved in the project since the beginning and have been using the recommended approaches to restore soil fertility are already proud to have eliminated salinity from their plots and are passing on their experience to younger farmers.

Remote control technologies for irrigation water in Kyrgyzstan attracted the interest not only of local water management departments, but also of the national government, and the country is currently seeking resources to establish an enterprise to produce control systems and install unique control devices at all water management facilities. National partners responded in the same way to the information about the potential and positive impact of hydraulic rams on degraded rangelands. Moreover, the country is successfully introducing the latest technology to create artificial glaciers.



The project is rapidly expanding the agricultural area cultivated with sugar sorghum in the arid and saline Kyzylorda region of Kazakhstan. This variety produces high yields in drought and saline conditions, while also restoring soil fertility. The project component aimed at effective management and restoration of degraded areas already covers more than 150,000 hectares of pastures.

In addition, important documents such as the land degradation assessment methodology, the feasibility study for scaling up agricultural restoration, and the economic evaluation of agrotechnologies implemented by the project in the field have been developed for the entire region.

The project has invited international experts who specialize in attracting resources from international financial sources to cooperate in scaling up sustainable management practices in Central Asian countries.

Cooperation continues with the international portal WOCAT that widely disseminates information about successful technologies and practices of sustainable resource management. Intensive preparation of the third phase of the project is also underway – consultations are held with partners at the level of participating countries and international organizations.

The participants of the program meeting in Antalya also presented the project implementation plans in the countries for 2023.

Modernization of irrigation systems in Central Asia

According to the findings of a new FAO publication, modernization of dilapidated irrigation and drainage infrastructure in Central Asian countries is one of the key prerequisites for the growth of the agricultural sector and the economy of the entire region.

Upgraded systems can help improve such indicators as the efficiency of irrigated agriculture under aggravating water scarcity, the reliability and cost-effectiveness of services to farmers in response to their needs, and agricultural productivity to meet the growing demand for food and its exports.

They can also contribute to national development goals such as economic growth adapted to climate change, food security, and poverty reduction.

The report "Modernizing Irrigation in Central Asia: Concept and Approaches" outlines practical recommendations that can be applied to improve irrigation systems in Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan.

Intended for policy makers, irrigation experts and international financing partners, the report draws on the experience and ideas gained from the FAO study carried out within the framework of the World Bank's regional assistance program.

According to Rimma Dankova, Senior Adviser, FAO Investment Centre, one of the authors of the publication, the first step is to understand the essence of modernization.

"It's not just about physical renovation of irrigation systems, it's about changing water management in agriculture, introducing new technologies and agronomic practices, using available innovation, knowledge and expertise," she said. "A whole set of measures covering the technical, agricultural, institutional, political, economic and financial spheres is needed."

Sector problems

Most of the region's irrigation systems are still in operation, but the bulk of their potential remains unused due to the physical deterioration of infrastructure due to years of underfunding, changes in ownership, inefficient economic organization and management of agriculture, and other constraints. The available water resources are unevenly distributed among the five countries. The downstream countries - namely Turkmenistan and Uzbekistan - rely heavily on regional transboundary agreements to supplement their domestic renewable water resources.

Under the influence of climate change, a decrease in the volume of water obtained from glaciers is predicted, evapotranspiration and precipitation fluctuations will increase, which will lead to increased droughts and floods in the region.

The report is available in English and Russian.

Holistic approach

Modernization of irrigation and drainage infrastructure in Central Asia requires a management-oriented and result-oriented approach.

The publication presents a concept based on five action areas, in particular: development of water use policy and relevant legislation; institutional reform; technical modernization of systems; strengthening agriculture services and practices; and building knowledge and information systems.

For example, in most Central Asian countries, the same organization manages water resources and provides irrigation services. However, given the growing importance of other water uses, such as domestic water supply, hydropower and industry, a legal framework is needed to separate the process of water planning and management from irrigation management.

Another important area is the development of national plans for irrigation modernization to define the concept and strategy for renovation. Such plans should present options for investing in different types of systems, such as gravity or machine irrigation, monoculture, or crop rotation.

The introduction of digital technologies for precision farming - remote sensing, drones for crop and soil monitoring, automated weather stations, etc. - improving the efficiency and reducing the costs of irrigation is possible. In addition, renewable energy sources can be used to reduce costs of machine irrigation and keep them low while minimizing the carbon footprint.

According to Winston Yu, Practice Manager, Europe and Central Asia Region, World Bank Water Global Practice, successful modernization requires adaptation to certain types of irrigation systems.

"In some cases, it is advisable to introduce high-tech operating systems, in others – not," he said.
"The pace of modernization should also correspond to the context of a particular country."

It is the authors' position that when the state and the private sector decide to modernize irrigation systems, "they need to consider that it does not start and end with a single project, it is a continuous process of maintaining and improving the performance of irrigation systems."

The project promotes establishment of Alley of Peace in Almaty

At the end of 2020, the Alley of Peace was laid in the Botanical Garden of Almaty in honor of the 75th anniversary of the UN. In late fall of 2022, trees of various species were planted, and the installation of a sprinkler system was completed with the assistance of CACILM-2.

Public "green spaces" are one of the initiatives rapidly gaining popularity worldwide in modern urbanism - the science of operating and developing cities in inseparable tandem with nature, sustainable solutions, and clean, renewable energies.

Garden and forest areas are acquiring the status of "green lungs" of cities, places where people socialize, relax, and replenish the energy of creativity. Such sites are designed to be comfortable, attractive, meaningful, and filled with relevant content, both visual and cognitive.

The Alley of Peace project is a landscape-architectural complex including trees planted along the walkway on both sides (black pine) and two sculptures, surrounded by paving (first and second circle) and growing trees.

The total area of the site is 2000 square meters, the sprinkler system is connected to an underground well, and maintenance of the system will be carried out by the Institute of Botany and Phytointroduction of the Committee of Forestry and Wildlife of the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan.

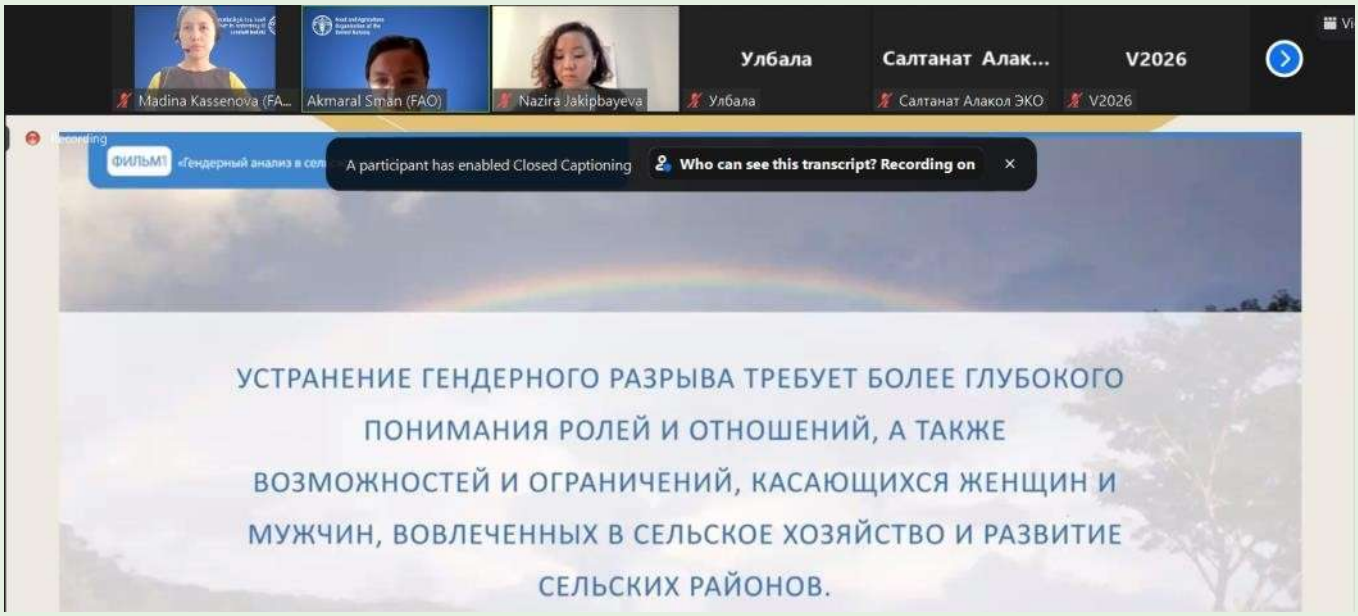
The Alley of Peace was initiated by the NGO
Almaty Diplomatic Club with the support of the Representative Office of the Ministry of Foreign Affairs of the Republic of Kazakhstan. The project was implemented with the active support of CACILM-2, diplomatic missions, and international organizations accredited in Almaty.

"FAO's initiatives in the field of "green development" of cities on the Planet and our project's mission in the field of ecology overlap," said Makhmud Shaumarov, Regional Project Coordinator. "The UN Convention to Combat Desertification, the UN Framework Convention on Climate Change and other fundamental documents signed by the UN member states in the 21st century oblige countries to take all measures to maintain comfortable conditions for human existence and favorable environment for everyone."

Building capacity for gender equality and women's economic empowerment

A webinar "**Women in agriculture in adaptation to climate change**" was held to mark World Rural Women's Day (October 15, 2022) in Kazakhstan

More and more people around the world are becoming aware of the potential for gender equality and women's economic empowerment in the production of social and economic goods and climate change resilience.



Evidence shows that climate change is primarily affecting agriculture, an industry that employs at least a third of the world's women, no doubt most of all women in rural areas, where along with farming, women usually have to take care of the family and household chores.

However, rural women, due to financial difficulties and time constraints, do not use agronomic techniques that increase resistance to climate change, since they spend most of their time on rural life arrangements, while could have explored and put into practice climate-resistant farming approaches.

The impact of climate change on agricultural production disproportionately affects the well-being of different population categories, and one of the most vulnerable groups is women living in rural areas, which reduces their potential contribution to sustainable development.

Held in partnership with the National Chamber of Entrepreneurs of Kazakhstan Atameken, the webinar was aimed at consolidating participants' knowledge about the concept of gender equality and social inclusion, gender gaps, the impact of stereotypes and prejudice on the status of women in society.

Kazakhstan expands pasture areas with sustainable management technologies

In partnership with the Union of Crop Growers of Kazakhstan, and the Kazakh Research Institute of Livestock and Forage Production, the project continues working on the introduction of sustainable agronomic techniques for pasture management.

The project developed recommendations for pasture resource management and analyzed the condition and utilization of pastures. In the pilot areas in Almaty and Kyzylorda oblasts, 450 hectares of degraded land were reclaimed with the use of drought- and salt-tolerant crops.

Heads of four farms in Almaty and Zhetysu oblasts, who own 992 head of small and cattle and manage 3,210 hectares of arid pastures in southeastern Kazakhstan and actively cooperate with the project, recently received fuel and lubricants and barbed wire to protect pastures from trampling.

In 2021, when an unprecedented drought struck southern Kazakhstan, farms faced severe forage shortages and rising retail prices for animal feed. In addition to the drought, cattle trampling caused decline in pasture yields.

Plans for pasture management in Almaty and Karaganda regions covered 127 thousand hectares. In the project areas, pasture grasses are sown, and seeds of drought-resistant pasture crops are distributed. At the same time, livestock farmers, supported by the project, continue to build their capacity to adapt to climate change, apply effective agrotechnologies, and use crops that contribute to the regeneration of this valuable natural resource.

To prevent further economic losses, farms were advised to switch to drought-tolerant forage crops and use barbed wire to protect pastures from trampling.

When selecting farms for assistance, the availability of basic equipment (tractors, combines) and cultivating machinery (plows, harrows, cultivators, seeders) was also considered.

"Soils: a Source of Food". Conference in Kazakhstan for the World Soil Day

On December 2, 2022, on the eve of the World Soil Day, the capital of Kazakhstan hosted the conference "Soils: the Source of Food" with the support of CACILM-2.

Representatives of the government of Kazakhstan, expert and academic communities, international and national organizations involved in creating conditions to prevent degradation and gradually rehabilitate this invaluable natural resource, shared their experience and proposals for this sector, which is crucial for the well-being of the country.

Soil experts say the soil is a very complex system, closely interconnected with other environmental components, and the great importance of the ecological functions of soils has been recognized in recent decades. Scientists consider soils as a critical link in the interaction of geological and biological cycles of elements on Earth.

Nevertheless, in the last three decades, the soil has been subjected to intense anthropogenic impact, whereas intensified use of this valuable natural resource has led to depletion and, in some places, to complete degradation of the soil.

"Land resources are of exceptional importance for the livelihood, prosperity and well-being of the country," said Baglan Bekbauov, Vice-Minister of Agriculture, in his welcoming address to the conference participants. " Our contemporaries and future generations depend on them literally, our ancestors used to say: Zheri baidyn eli bai," he said.

Therefore, one of the key items on the conference agenda was the issue of degradation of soil - the most important agricultural resource of Kazakhstan, the rational use and improvement of the fertility of which guarantees food security and sustainable development of the country.

As Murat Temirzhanov, Chairman of the Land Resources Management Committee of the Ministry of Agriculture of Kazakhstan, and National Coordinator of the UN Convention to Combat Desertification, noted, Kazakhstan ratified the Convention to Combat Desertification and thereby committed itself to taking all necessary steps to prevent desertification, land degradation and mitigate the consequences of this phenomenon.

The conference participants noted that the country needs to widely implement agricultural approaches that are not harmful to soil and other natural resources, as well as take steps to help reclaim saline and eroded lands.

Since 2018, CACILM-2 has been successfully operating in Kazakhstan focusing on the adaptation and dissemination of integrated natural resource management practices in drought- and saline-prone landscapes of agricultural production through the introduction of sustainable management techniques that put minimal pressure on natural resources and cause no damage to them.

"Human civilization development continually faces the threat of soil resources depletion and degradation, which soil experts call "the silent crisis of the planet," said Makhmud Shaumarov, Regional Project Coordinator, in his welcoming remarks to the conference participants. "Since the start of activities in 2018, the project has accumulated vast experience of fruitful cooperation with scientific research institutes and a number of partners in Kazakhstan; the introduction and scaling of effective, time-tested approaches to prevent degradation, including the salinization of degraded soils, as well as the transition to drought-resistant species, allowing to obtain sustainable yields despite a decrease in precipitation," he emphasized.

Based on the conference results, recommendations are developed for all organizations involved in the processes of assessing and taking measures to preserve and improve soil fertility.

Artificial glaciers — a modern approach to climate change adaptation: interview with Abdimalik Yegemberdiyev, Director General of the National Association of Pasture Users of Kyrgyzstan Kyrgyz Zhayity

1. *The technology for creating artificial glaciers is not new - it is already used in some countries in Southeast Asia. However, so far it is only used for small highland settlements, while the maximum irrigation area from a single glacier is no more than 155 hectares. This technology is being introduced for the first time in our country and in Central Asia as a whole. In your opinion, how can these technologies be used in Kyrgyzstan to maximize their benefits to the population?*

Due to the lack of water for livestock, watering vegetation, and domestic needs, vast areas of summer pastures in Kyrgyzstan remain abandoned. Pasture users have to use more comfortable areas of nearby pastures for grazing and living, thereby increasing pressure on resources, and disrupting the rotation system necessary for effective and uniform grass regeneration.

Thus, a need emerged to regulate the water balance in remote pastures and to ensure conditions for seasonal rotation of pastures throughout the year. For this
purpose, Kyrgyz Zhayity proposes to implement an innovative approach of creating artificial glaciers in remote, arid areas and in those areas of pastures that lack water for grazing livestock.

There are mountain springs and streams with varying volumes of water in the highland pastures, which tend to dry up in the spring and summer season. Therefore, engineers of the Pasture Users Association have developed an easy to implement and inexpensive, yet effective way to accumulate fresh water during the fall and winter.

We are talking about creating artificial glaciers, an engineering structure for transporting water from a natural source over a short distance for freezing in the fall and winter and further use in the spring and summer. This can be a salvation for settlements located far from natural reservoirs and riverbeds. It also represents an opportunity to create comfortable habitat for farm animals and pasture users, and one of the practical approaches to climate change adaptation and mitigation.

Key advantages:

1. Access to potable water.

These devices will allow shepherds to use clean, fresh water for their domestic needs and for watering livestock. Consequently, more and more pasture users will be able live comfortably and let their livestock graze on remote pastures, thereby not disturbing the natural regeneration processes of the pastures close to the villages.

2. ***Irrigation of arid territory***.
This mountain water can be used to restore drought-prone and degraded pastures, improve their grass cover, and rehabilitate soil fertility.

3. ***Creating opportunities for planting trees and other vegetation***.

Water from the glacier melting under the rays of the sun during the spring and summer allows for other uses of these areas. For example, shrubs and trees that can be eaten by animals can be planted in these areas along with fruit and berry crops using the agroforestry system.

4. ***Conservation of biodiversity and microclimate of the territory***.

As experience shows, the number of animals and birds decreases in arid areas, so providing access to water can contribute to the gradual restoration of the natural balance of the territory, improving biodiversity and preserving the quality microclimate for animals.

5. ***Adaptation to climate change***.

Artificial glaciers are one of the most cost-effective and uncomplicated approaches to mitigating climate change in mountain regions and are proven by the experience of other countries and several pilot projects on the territory of Kyrgyzstan. This method's advantage is its simple design, low cost of construction, possibility of creating glaciers in hardly accessible areas, and the fact that no special training is needed. The project can easily be implemented by the local community itself, under the coordination of the pasture users' association.

2. How many structures will be built as part of the CACILM-2 project and where will they be located?

Several projects, including CACILM-2, plan to create 10 artificial glaciers, tentatively one in each region of the country and an additional three in remote and arid territories. To date, such glaciers already operate in Naryn, Issyk-Kul, Chu and Osh oblasts, and the experience of these communities will be tapped to improve the technical characteristics of new glaciers.

3. How stable/reliable is the equipment that is already used in the construction?

This structure is stable and reliable, because the main principle of its creation was the participation of residents themselves, who undertook most of the field work, contributed to the construction, commissioning and maintenance of this structure.

To ensure the stability of the vertical pipe during spouting, this pipe is attached to a pre-installed vertical reinforced concrete post on a concrete base. To improve the stability, the main pressure pole of the fountain, if necessary, should be supported by wooden sloping beams on different sides. Branches of caragana (a thorny shrub that is inedible to animals and grows quickly in pastures and forms a barrier for animals) or any other branched shrub plant are placed around the original structure (and approximately every 50-60 cm of thickness at various stages of ice accumulation, if possible) to provide additional surfaces for icing.

In addition, to protect the structure from cattle or other possible damage, several rows of barbed wire can be placed around the glacier, which would also serve as a base for ice accumulation. Since the creation of the first glacier in the village of Zhergetal to the present day, the very principle of glacier building has not changed, but the climate and geographical features were accounted for, as well as various engineering additions and technical improvements proposed by the residents, engineers, and users of this structure.

4. Who will monitor the condition of the installations on the ground?

The National Association of Pasture Users Kyrgyz Jayity is the primary implementer responsible for the operation and protection of the created artificial glaciers, while locally the responsibility is assigned to pasture committees (members of the Kyrgyz Jayity Association).

5. What would be the amount of the project that the CACILM-2 could support?

The average cost per glacier ranges from USD 4,000 to USD 10,000, depending on the geographic and climatic features of the area, the amount of water supply and the number of vertical pipes for spouting, as well as the contribution of the local communities.

Farmers of Kyrgyzstan mastering modern digital technologies

The Food and Agriculture Organization of the United Nations (FAO) is an international organization founded on a deep knowledge of all sectors of agriculture, and those who work in agriculture understand that no success in modern agriculture is possible without knowledge, proficiency in agrotechnology and the latest tools, including digital ones.

This is especially relevant now, as climate change is undermining the productivity of agricultural and pasture lands in all Central Asian countries, including Kyrgyzstan.

Rising temperatures and decreasing precipitation threaten pastures with desertification, directly affecting the productivity of the livestock industry vital to the well-being of more than a third of Kyrgyzstan's population.

As mountain roads and bridges leading to distant (summer) pastures are destroyed in many locations, and considerable investment is required to restore and maintain them, pastoralists are forced to use nearby (near villages) pastures for grazing. As a result, these pastures suffer from extreme stresses, while distant pastures are not used at all becoming degraded and overgrown with non-edible plant species and shrubs.

Estimates indicate that 49 percent of all pastures in the country are degraded, including 36 percent of pastures at some distance from villages (summer grazing), 50 percent of spring and fall pastures, and 70 percent of pastures near villages.

On the other hand, half of the country's pastureland is sufficient for grazing 6.2 million sheep and goats, 1.7 million cattle and 0.547 million horses across Kyrgyzstan (*data from the National Statistical Committee as of the end of 2021*) given the average pasture productivity.

Therefore, effective, sustainable, and responsible pasture management can contribute to the rehabilitation of degraded areas and further development of livestock breeding in Kyrgyzstan.

"Agriculture is the only sector of economy that is both the source of the problem itself and the way to solve it," say the world's climate change experts. The project objectives, including the dissemination and scaling up of the most effective technologies and approaches to integrated natural resource management in the country, therefore coincide with Kyrgyzstan's national priorities.

In October 2022 a training on sustainable pasture management methods based on successful experience in land management, digitization of land use maps and geobotany was held in Bishkek in the framework of

CACILM-2 cooperation with the National Association of Pasture Users Kyrgyz Jayity.

It consisted of two modules: Self-Evaluation and Holistic Assessment of Climate Resilience of Farmers And Pastoralists (SHARP+) and Using Satellite Data for Drought Monitoring and Early Warning. FAO tool, ASIS (*Agriculture Stress Index System*)"].

Mastery of these two tools will help CACILM-2 partners in the country to independently assess the resilience of farmers and pastoralists to climate change and the condition of pasture resources using satellite data and to develop measures to prevent degradation of the most valuable natural resource in the country and to restore degraded areas.

The training was conducted to build the capacity of the staff of strategic and associated partners of the project - the Ministry of Agriculture of the Kyrgyz Republic, National Association of Pasture Users Kyrgyz Jayity, Association of Water Users, Pasture Committees, Kyrgyz National Agrarian University, and other partners.

The project partners took part in the celebration of the World Food Day in Dushanbe

CACILM-2 partners and beneficiaries in Tajikistan actively participated in the World Food Day (WFD) Festival held in Dushanbe on October 16, 2022, under the motto "Leaving no one behind - *improving production, food quality, environment and quality of life*".

In preparation for the Festival, three organizations have joined forces - FAO, WFP and the Social and Industrial Food Institute (SIFI) - to call for solidarity and action to transform agrifood systems.

The festival included pavilions, workshops on healthy and wholesome eating, a theater performance and a photo exhibition dedicated to the main theme of the holiday.

best practices in soil desalinization and reclamation, as well as the use of drought- and salt-tolerant varieties to festival participants.

The festival gathered more than 300 participants including representatives of the government, embassies, international and local partners from among NGOs and civil society.

This year, the organizers emphasized the role of women and youth as future champions of change who can build a better and more sustainable future. Various youth groups were involved in the celebration of the WFD 2022 as volunteers, participants, and performers. In addition, an educational and entertainment space for children was arranged at the festival.

The area consisted of a photo zone with vegetables, educational quizzes about healthy eating and interactive performances that highlighted the significance of wholesome nutrition from early childhood.

Representatives of the government of Tajikistan, FAO, and WFP, opening the festival, underscored the responsibility of the global community to eliminate the causes of hunger and malnutrition and to ensure a healthy and balanced diet for all.

Collective action in 150 countries makes the World Food Day one of the most widely celebrated days in the UN calendar. Governments, private sector, academia, youth, and civil society must work together to ensure the rights of all people of the planet to food, nutrition, peace, and equality. Everyone can contribute to an inclusive and sustainable future by showing more compassion and kindness in their actions. It's time to build a better and more sustainable future for everyone.

Success story of Gavkharoy Khasanova, an active participant of the project in Tajikistan

Gavkharoy Khasanova's products were displayed at an exhibition dedicated to the World Food Day on October 22 in Dushanbe. Many visitors showed interest in the clean and quality product - dried tomatoes, apples, and plums.

Gavkharoy Khasanova is 53 years old and lives with her family in the village of Dusti, Vakhsh District. The family has eight people - two daughters, three sons, a daughter-in-law, and two grandchildren. Gavkharoy raised all her children being a role model of honesty and diligence. Gavkharoy's hard-working and friendly family has a 0.40-hectare garden plot, where they grow tomatoes, eggplants, legumes, and corn. In addition, fruit trees grow in the yard.

The head of the family is an active member of the Farmer's Field School. From the first days of the project, Gavkharoy joined the group and began to attend meetings. Both young and old farmers are in the group, while women make up more than a half of the group. Like many women in the village, Gavkharoy manages her own household.

Using their own skills and knowledge gained in the field school, the family works the land and selects quality seeds for the homestead plot, applies agronomic rotation and fertilizes the soil with compost. As a result, harvests grow, ensuring the food security of the family.

Every year the family enjoyed an abundant harvest of apricots, cherries, and plums, and made juices and jam for the winter. Occasionally fruit was dried under trees and on the barn roof, but it would get stale and ugly.

When the project specialists conducted a training session in the village on drying fruit and vegetables, Gavkharoy asked many questions and shared her experience and problems. After the training, 13 active farmers obtained solar dryers and Gavkharoy was one of the beneficiaries of this grant.

Gavkharoy really loved the modern and user-friendly fruit dryer. FAO specialists explained that these dryers can be used to dry fruit and vegetables all year round. This made Gavkharoy and the other group members very happy, as they had also been drying vegetables, but the dried vegetables were ugly and unpalatable.

When the dryers were delivered to the villages, autumn had already come, and it was time to process the harvest. Using the knowledge gained from the training, the energetic lady-farmer set to work. Eventually, apples, plums, quinces, as well as tomatoes, eggplants, peppers, and even corn were ready for sale and consumption in a short time. The family received 650 somoni of income from the sale of dried tomatoes alone.

As the solar dryer is large (14/6), Gavkharoy's neighbors use it as well. The woman also taught her neighbors to use the dryer, and they are ready to buy this valuable device for their households.

Connect to the sun: growing a crop is half the battle, it still needs to be kept

Growing a crop takes a lot of effort, time and resources. But preserving the harvest is a task no less important. To help farmers in the areas with challenging climate, like Kushoniyen, Vakhsh, Jami and Yavan of Khatlon region of Tajikistan, the CACILM-2 project purchased 40 solar installations for drying berries, fruits, and vegetables for a total amount of more than USD 40 thousand.

Sixty percent of the recipients of the new equipment are active women managing farms.

Farmers in Central Asia have always practiced processing and drying their harvest. People would use the rooftops of their homes, or vacant plots of land in their farms, for this purpose. The drying process took weeks, while the fruit would become covered in dust and look unmarketable.

Now, each solar dryer of 12 square meters can produce up to 75 kilograms of dried apricots from 300 kilograms of apricots in a single cycle (10-14 days), subject to temperature and humidity.

Along with protection from dust and rain, the equipment helps protect the dried fruit from rodents, insects, and birds, preserves its taste, color, and marketable appearance, while also contributing to efficient value chains, which helps farmers reduce harvest losses and earn steady income.

In addition to fruit, the equipment can also be used to dry berries, grapes, vegetables, and medicinal herbs.

Oleg Guchgeldiyev, FAO Representative in Tajikistan, representatives of the Committee of Environmental Protection under the Government of the Republic of Tajikistan, Ministry of Agriculture of the Republic of Tajikistan, local authorities, local NGOs, project partners, and farmers participated in the equipment handover ceremony.

"The project introduces both well-established and innovative technologies for effective and sustainable management that help reverse the degradation of environmental resources," said Makhmud Shaumarov, Regional Coordinator for CACILM-2. "The project also promotes the sustainability of farming communities in the most climate disadvantaged regions of Central Asia. Modern equipment that requires no other energy sources than renewable energy from the sun, water or wind has an important role to play in this process," he said.

Integration of agriculture and water management of Turkmenistan into national plans for adaptation to climate change

Turkmenistan vigorously contributes to the implementation of the Paris Climate Agreement ratified on October 23, 2016. Turkmenistan adopted its National Strategy on Climate Change in 2019 based on the country's commitments under the Paris Agreement and in the context of implementing the UN Sustainable Development Goals. One of its main tasks was to develop and implement measures to adapt to climate change for all branches of the two most important sectors of the country's economy - agriculture and water management.

International experience formed the basis for defining the basic principles of work on adaptation to climate change and their subsequent inclusion in the national plans for the development of agriculture and water resources. The document can serve as a guide for decision-making in critical situations and indicates the limits of adaptation activities in a changing climate. It is a kind of a support mechanism that can be used to plan and take productive steps.

Turkmenistan has committed to develop and implement an adaptation plan for its territory.

This includes:

- ü building and leveraging national capacity;
- ü involving relevant specialists;
- ü developing new or revising existing regulations, rules, and standards;
- ü drafting methodological guidelines and other documents that will facilitate addressing the identified problem.

Adhering to the basic principles of this integration into national action plans will help in the development of adaptation measures and principles of accountability for their implementation.

The participation of stakeholders and decision makers will support the goal. Local communities, agricultural producers facing the climate change impacts in their activities are directly interested in using new and more efficient methods of farming. The exchange of knowledge in the field of adaptation of agricultural producers and water management facilities to climate change through consultations with all interested parties will contribute to the success of this work. These include local communities, employees of water management organizations, land, and water users, local, regional, or national public agencies, research institutes, agricultural educational institutions, nongovernmental organizations, representatives of the private sector, etc. Addressing the opinions and suggestions of stakeholders is a critical success factor in the implementation of

adaptation measures. The benefits to all stakeholders are as follows:

- ü consideration of interests, problems and needs;
- ü information support in decision-making;
- ü reaching consensus (no conflicts);
- ü an opportunity for public control of the operation of all systems included in the operation;

- ü availability of ongoing feedback;
- ü an opportunity to advance knowledge, skills, and awareness of goals;
- ü a relationship of trust between the state and agricultural communities that promotes long-term cooperation.

Integration of adaptation into sustainable development processes. Turkmenistan's National Strategy on Climate Change stipulates that adaptation measures should be integrated into the country's long-term national development strategies, plans and programs.

For this purpose, a National Adaptation Plan will be developed in the coming years, and one of its most important objectives will be the integration of all related activities into both existing and new development plans for all sectors of the country's economy. This will identify new synergies in dealing with the challenges posed by climate change.

Environmental sustainability of agriculture and water management. In the arid climate of Turkmenistan, agriculture is the largest consumer of water (about 90% of all water resources of the country). Irrigated farming, while ensuring the country's food security, affects the environment, especially in the arid zone, where ecosystems are fragile and vulnerable to any external influences. Solving the water use management problem requires good knowledge of relevant international experience. Unfortunately, traditional decision-making methods in this domain are not always effective. Incomplete and inaccurate consideration of various factors can lead to a decrease in land fertility, resource efficiency, and environmental degradation. Environmental sustainability principle holds that all adaptation measures to climate change must be commensurate with economic, social, and environmental factors to ensure the best possible solution to the given problem. This is why agriculture is now not only one of the economic activities of a state, but also a factor that determines the condition of the environment.

Land degradation (salinity, fertility loss due to unsustainable use, excessive application of fertilizers and pesticides, as well as climate change effects) is the most pressing problem today. Environmental sustainability can only be ensured if agricultural production meets the appropriate requirements. Indicators of land degradation (groundwater occurrence level and salinity, soil salinity, drying and swamping of surface and root layers, presence of weeds, reduced number of earthworms or their absence, etc.) are used to assess compliance with these requirements.

Integration of adaptation into major planning processes (*plans, approaches, mechanisms*). *C*limate change adaptation will be most effective when it is integrated into the core activities of organizations (their environmental policies, plans, approaches, and programs).

The development and inclusion of adaptation measures in

agricultural and water development plans should be based on a scientific approach that relies on the results of monitoring and assessment of the situation. Monitoring and evaluation are supported by research institutions, hydrometeorological and agro-ecological monitoring services, and agrochemical laboratories.

This mechanism has not been fully developed yet, there is also a need for regulatory framework, adoption of legislation governing the scientific support of agricultural production in the context of climate change. Involvement of private entities and individual entrepreneurs in the agricultural sector has a negative aspect, as the latter often seek profits ignoring the requirements of environmentalists.

The mechanism of adaptation to climate change consists in resource provision for the process of adapting agricultural production to new circumstances, and the adaptation plan is part of the production plans of all agricultural businesses and is largely financed from their funds. In this case, a number of activities can be included in the state program for the development of rural communities. At the present stage of agricultural development, natural and climatic conditions of the territory must be considered when designing new technologies for growing various crops. Methods of modeling of agro-ecological zones are widely used for this purpose. These zone models are a powerful tool in planning adaptation measures because their selection requires information about the condition of soil and water in that area. For instance, irrigation, reclamation, and agronomic measures are developed based on soil survey data and assessment of the meliorative condition of irrigated lands. The implementation of adaptation measures developed using the model of agro-ecological zones is covered by financial resources envisaged by the production and financial plans of farms.

Gender equality is a fundamental pillar of sustainable development, so all aspects related to it are embedded in national programs.

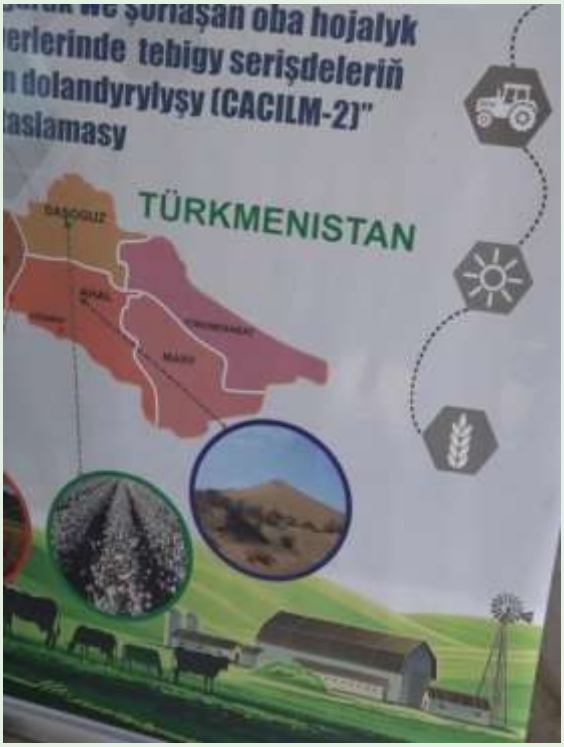
In arid climate, water availability and its sustainable use determines the development of agriculture. The gender dimension of water management is reflected in the Johannesburg IWRM Implementation Plan approved at the Dublin World Summit (September 2005). The role of women as water providers and users rarely finds a place in institutional structures for water and land use management. Observance of this principle requires enabling and empowering women to participate in all processes of water management at all levels.

Promotion of evidence-based scientific approaches. The development of national and local climate change adaptation plans for agriculture and water management requires common scientific and methodological approaches. In this context, the Food and Agriculture Organization of the United Nations (FAO) offers a wealth of experience in the use of scientific knowledge and advice from local communities. If there are any uncertainties, scenarios are developed to make informed decisions. Therefore, one of the guiding principles for incorporating adaptation measures into agricultural and water development plans is to promote sound scientific approaches involving monitoring results and all necessary measurements.

However, the results of climate studies alone are not sufficient; data from systematic observations of the soil cover and groundwater occurrence in a particular farm and the reclamation status of irrigated land are required

as well. This approach to developing an adaptation plan in the face of climate change is mandatory. Each farm must have a "field passport", that is, a database of land use. This allows for more efficient and rational use of land and water resources and the development of appropriate technical, economic, and organizational measures. The database contains records of field size, mechanical composition, and degree of soil salinity,

nutrient content and its variation by year, crop rotation, quantity and quality of yield, agronomic measures, and land reclamation status.



Creating the database requires that farm specialists, landowners and tenants can be confident in using modern equipment and appropriate techniques. In this regard, one of the main tasks of scientists and experts is to provide daikhans with essential information and recommendations. The success of this mission requires close cooperation of daikhan farms and associations with research centers, application of modern innovative technologies of farming by means of creating a simulation computer model. The essence of modeling is that the profitability of agricultural production is determined depending on the natural and climatic conditions considering the expected level of water availability during the whole period from crop sowing to crop ripening. To implement the principle of promoting science-based approaches, it is important to detail the agro-ecological zones, especially when selecting crops to grow in a particular region of the country, taking into account its socio-economic factors and the state of irrigated land.

Models of agro-ecological zones provide an opportunity to identify the impact of climate change, calculate possible benefits, or predict economic damage and, accordingly, develop a mechanism to evaluate and integrate the research findings into development plans.

Transparency in climate change adaptation processes. Turkmenistan is a party to the Paris Agreement that takes an active part in the planning and implementation of its provisions on adaptation to climate change, including the development of a national

adaptation plan. The latter requires building mutual trust among partners, application of transparent methods of work and evaluation of uncertainties, observance of the parties' interests, planned activities, etc. This approach is very important in a cross-industry

context, where certain issues require confidentiality. The main ways to achieve transparency of action are collaborative collection and exchange of data and information, regular contacts with specialists in other industries, and preparation and dissemination of joint reports.

Flexibility of adaptation processes. Strategies, plans, and measures for adaptation should allow for a certain flexibility in action and the option to adjust them as necessary. Flexibility is effective adaptation, that is, the ability of an organization to rapidly change its internal rules, structure, and activities without involving additional financial resources. It is one of the primary drivers of organizational vitality and sustainability of its activities.

In the context of Turkmenistan, flexibility of adaptation processes is a very relevant principle in water resources use and agricultural production management.

The vulnerability of the agrarian sector to natural and climatic conditions and the risk of economic damage to agricultural producers from various disasters necessitates extensive reliance on hydrometeorological information to minimize losses. This principle is stipulated in the Water Code of Turkmenistan (Article 104/4) emphasizing the need for technical and economic tools to manage water use to respond to changing conditions.

Revision of water use limits requires changes in the technology of agricultural plant cultivation. This will change the duration of the irrigation interval,

expected crop yields, conditions, norms, and timing of mineral fertilizer application, etc. Tools that take into account the new conditions and limits are needed to revise technology. Computer models of irrigation planning may become such tools.

Adherence to the flexibility principle by water management organizations and farms implies the need for continuous improvement of activities, adaptation to new conditions, information availability, continuous training through interactive approach for better situational awareness and agile and effective decision-making.

The process of climate change adaptation and the provision of an opportunity to verify the results of this work is the *responsibility* of the relevant entities. It is enshrined in the regulatory, methodological, and institutional framework. Relevant documents should establish the procedure for the preparation and submission of reports on the measures taken by the actors of adaptation, the procedure for their acceptance and verification by executive authorities. The actors in the adaptation process are held responsible for the late submission of reports on the implementation of adaptation plans or for inaccurate information.

Implementing the adaptation process requires changes in the activities of organizations, while their leaders must show interest, openness, and the ability to manage by:

taking responsibility for the outcome of adaptation measures;

defining adaptation policies and goals that are compatible with the strategic focus and context of organizations;

governance of adaptation processes;

confirming the availability of resources for adaptation measures;

exchange of information, timely reporting, and enforcement of penalties.

The manager's commitment to adapt to climate change provides an opportunity to formalize the organization's structure, when the roles and responsibilities of its employees are clearly defined, enabling it to function effectively.

Addressing adaptation at the grassroots level is one of the principles of incorporating the related topics into national and local agricultural and water development plans. According to this principle, the rights and interests of local communities, organizations, and daikhan farms have priority over higher-order structures, including

ministries, and its observance implies the need to redistribute responsibility from the bottom up, with higher governing bodies assuming the functions that the lower structures cannot perform.

In arid climates, consideration of local natural climatic and economic conditions is essential for adaptation decisions. This is beyond the ministry's power. In this

context, applying zonal technologies, which provide the same recommendations for all farms in the region, violates this principle. In this regard, it is necessary to use methods and approaches focused on the natural and climatic changes that have occurred in recent years. The laws and codes contain general provisions, which need to be elaborated by lower-level regulations. This requires the development of new or updating of existing provisions and regulations, methodological guidelines, standards, and other documents, which will contribute to the solution of problems caused by climate change.

The principle under consideration implies the need to adopt a consistent methodology for assessing the risk of climate change, ranking measures for adaptation to new conditions, developing plans at different levels and indicators of their implementation.

Systemic thinking involves understanding the complex and interconnected mechanism of various organizations. Adaptation of agricultural and water management enterprises to climate change is possible through sustainable land use management (SLM). The multitude of structures involved in this process and the complexity of their interrelationships require a systematic approach. Systemic thinking is a way to analyze the range of interactions and interdependencies affecting organizations, including the interaction and interdependence of organizational boundaries.

At present, daikhan associations interact with many service organizations engaged in the provision of agricultural products and supply of water to producers. Coordination between all participants in the process and the government agencies that oversee the activities of daikhan associations is of great importance for the successful planning and implementation of local adaptation plans. However, effective interaction between daikhan associations and government agencies is feasible only if they have the technical capacity and appropriate expertise.

Agricultural machinery to reduce resalinization and grow salt- and drought-tolerant crops.

All-wheel drive mini-tractors, which are optimal in terms of functionality, towing power, maintenance, and cost in Turkmenistan, prove especially efficient on small and medium-sized land plots.

This technique gives good results in sowing.

to the project partners as part of the project's cooperation with the Ministry of Agriculture and Environmental Protection of Turkmenistan.

Three all-wheel-drive tractors, three four-row seeders and three toothed cultivators, a seeder for no-till fields, and 15 two-wheel-drive rototillers will be used by the partners in agronomic operations.

High sowing speed, constant sowing depth with precise copying of the existing topography ensure uniform germination of sown crops.

No-till technology is considered particularly beneficial in deserts and semi-deserts, as it allows for preservation of the topsoil. It is used for direct sowing of both large seeds of corn, legumes, soybeans, cotton, peas and small seeds of wheat, barley, alfalfa, and rapeseed without any tillage.

Rototillers are used for continuous plowing and inter-row hilling, tillage in small areas, including orchards and greenhouses, as well as for mowing grass.

The agricultural machinery procured for Turkmenistan helps to mitigate resalinization and cultivate salt- and drought-tolerant crops.

The success of this equipment will ensure that the positive experience can be replicated throughout Turkmenistan.

Head of the FAO Subregional Office for Central Asia supports natural resource management approach in Turkmenistan

In 2018, an integrated natural resource management project was launched in the Central Asian region in arid and saline areas of Central Asia and Turkey.

Viorel Gutsu, Sub-regional Coordinator for Central Asia, emphasized that FAO supports Turkmenistan in its efforts to move toward integrated natural resource management.

Turkmenistan has been a member country of FAO since 1995. Cooperation with the international organization is constantly progressing and strengthening. FAO supports agriculture and food security in Turkmenistan by focusing on the introduction of modern approaches to environmental protection.

The project is funded by the Global Environment Facility and aims to stabilize the environmental situation, retain water in the soil, reduce moisture loss and counteract land desertification.

Learning to manage water effectively: trainings in Dashoguz

Two trainings: "AquaCrop model for integrating natural and climatic factors into irrigation planning" and "Effective methods and technologies for growing salt-tolerant crops and fruit trees to improve the ameliorative condition of saline lands in Dashoguz province" were organized from 21 to 23 September 2022 in Dashoguz.

The first training was held at the Turkmen Agricultural Institute in Dashoguz and was attended by the Institute faculty and representatives of the water sector from all etraps of the velayat.

The two-day training consisted of three training sessions and practical exercises in small groups. During the first session, participants learned about crop irrigation requirements and specifics of irrigation planning, climatic factors' influence on crop water consumption, calculation of evapotranspiration, irrigation methods used in Turkmenistan and Central Asia, regulatory and methodological documents on crop irrigation existing in the country and the capabilities of the FAO AquaCrop software model.

The second session dealt with the preparation of basic information and search for data and sources needed for irrigation planning based on the AquaCrop model. This was followed by practical exercises in small groups to create files - a PLU notebook for precipitation, a TMR notebook for air temperature data collection, and an ETO notebook for relative transpiration.

The second day of the training was devoted to the development of recommendations for water users on the agro-technology of crop cultivation using the AquaCrop model.

Practical work in groups covered three areas. The first group was engaged in predicting crop yields under water scarcity. The second one assessed the impact of irrigation on the planned crop yield under limited water allocation, and the third group developed a crop irrigation regime based on the irrigation water deficit using the AquaCrop model.

The training was attended by 27 participants, who received numerous practical manuals and booklets prepared by experts and published by the CACILM-2 project this year. Among them are publications on combating soil salinization processes, arranging forest shelterbelt around irrigated fields, etc., which can be applied directly in practice and in teaching students of relevant majors at the Institute lectures.

The second training was held within the framework of the Farmer Field School (FFS) activities and covered the areas of using effective cultivation methods and technologies, salt tolerant crops and fruit trees to improve the meliorative condition of saline lands in Dashoguz velayat. The training agenda included important issues related to methods of increasing yields and sustainable use of desert rangelands in the face of intensifying drought. The training included theoretical sessions, as well as a practical demonstration of field tools and equipment to determine the degree of salinity and fertility status of irrigated lands in the training and experimental farm of the Turkmen Agricultural Institute (TAI). Three presentations were delivered to the audience covering methods for combating re-salinization of irrigated lands and introducing technologies for desert rangeland reclamation and sustainable use in Turkmenistan. The project experts spoke about their work priorities, including approaches to fixing drifting sands, introducing efficient pasture rotation schemes and rational use of water resources to irrigate desert rangelands of the Karakum Desert.

Uzbek youth delegates at the World Food Forum in Rome, Italy

At the request of the Ministry of Agriculture of Uzbekistan, the CACILM-2 project provided support for the National Youth Delegation to participate in the World Food Forum.

The event took place at the end of October 2022 at the headquarters of the Food and Agriculture Organization of the United Nations (FAO) in Rome. Over 2,000 people gathered in the Italian capital to participate in the "Healthy Diets. Healthy Planet" forum, while tens of thousands more participants from all over the world participated online.

According to FAO estimates, conflicts, climate change and the COVID-19 pandemic are the key causes of the global food crisis. The authors of The State of Food Security and Nutrition in the World 2022 report note that 828 million people around the world already face hunger, an increase of 46 million since 2020.

Meanwhile, they noted the great potential that young people around the world could unlock by creating a global movement to solve the acute food crisis. That is why young people from all over the world came to the forum to share their visions and contribute to solutions to the challenges of the global food crisis.

The youth delegation from Uzbekistan included Saidzhakhon Khasanov, a doctoral student at the Tashkent State Agrarian University; Ummatoy Yuldasheva, director of innovative projects in the field of sustainable development; and other active and talented young people.

The discussion on "Meaningful opportunities for youth: digital tools and innovations in agriculture" was held on the sidelines of the forum with the support of the Embassy of the Republic of Uzbekistan in Italy, where members of the youth delegation made presentations on successful practices and results obtained during the implementation of CACILM-2 in Uzbekistan. The young speakers noted the successful experience of introducing technologies of sustainable resource use in the most arid regions of Uzbekistan through cooperation with the Ministry of Agriculture of Uzbekistan, the Agrarian University and other academic institutions, authorities, and communities on the ground.

"Prospects and problems of using digital technology to maintain soil fertility": World Soil Day in Uzbekistan

Scientists, specialists, and students of Uzbekistan who work in the field of agro-systems soil science greeted the World Soil Day with special festive mood.

This year, the Scientific Research Institute of Soil Science and Agrochemistry under the Ministry of Agriculture of the Republic of Uzbekistan in cooperation with the FAO and GEF project organized the national scientific and practical conference "Prospects and problems of using digital technology to maintain soil fertility" on December 5, 2022.

The forum brought together scientists and subject matter specialists on one platform. The conference presented new theoretical and practical developments of soil scientists, agrochemists and other representatives of the industry to address such problems as desertification, land degradation, salinization, soil erosion and environmental pollution. In addition, innovative ideas and digitalization achievements of the industry were presented.

Currently, the institute conducts 14 research projects, research is carried out to develop new technologies that contribute to improving soil productivity and prevent the effects of land degradation processes. Much is being done to introduce digital technologies into the industry, to improve the environmental condition of soils and the environment.

The Institute is also researching the improvement of no-till technologies, which will help improve soil fertility on agricultural land, creating the necessary conditions for organic farming, as well as the promotion of crop rotation in arid areas. The institute also develops environmentally safe, biologically active preparations to improve the condition of contaminated soils, works on creating 3D maps reflecting the level of soil contamination by toxic substances, and is developing a medium-scale soil map of the ecological and meliorative condition of degraded soils of the dried bed of the Aral Sea.

In terms of digitalization of soil science, research is being conducted on building a mobile application for processing data on reclamation of saline agricultural lands, creating 3D maps of irrigated soils of the republic and developing software for monitoring soil resources using artificial intelligence. For the first time in Uzbekistan, the Institute's scientists also conducted research to create a soil analysis technology based on international standards (51 ISO/TC 190 Soil quality).

Although not obvious at first glance, improving soil quality and fertility is a critical factor in ensuring food security, since the condition of the soil is directly related to the ability to grow high-quality agricultural products and produce organic food.

FAO is a reliable partner of the Institute, and they enjoy a long and fruitful collaboration. For example, this year, with the support of CACILM-2, the institute created a new laboratory of geographic information systems (GIS), which is equipped with the latest computers, server, data center, plotter, and GPS equipment.

Spatial information technologies make it possible to map land degradation processes, create efficient and operational information systems for soil analysis, obtain quick and high-quality information about the territory under study, open several opportunities for multi-year monitoring studies, and contribute to projects for neutralizing land degradation.

Soil is a crucial natural resource that is a major component of agricultural development and environmental sustainability, the basis for food, feed, fuel, and fiber production, as well as for providing many critical ecosystem services.

This resource is vital to human existence as soil sustains plants and all other living things. The World Soil Day once again reminds humanity of the need to sustainably manage soil resources and ensure healthy soils.

Uzbekistan and Turkey develop cooperation on forestry

The Uzbek delegation consisting of the representatives of the State Forestry Committee, Ministry of Finance, Ministry of Investment and Foreign Trade of the Republic of Uzbekistan and the FAO specialists visited Turkey in late October 2022 to be introduced to the practices of restoration of forest lands in Turkey and continue cooperation on forest biodiversity conservation and reforestation. The visit was organized within the framework of cooperation between the State Forestry Committee of Uzbekistan and the Ministry of Agriculture and Forestry of Turkey, supported by two FAO projects, including CACILM-2.

In particular, the parties agreed on the need to develop and subsequently implement new projects for human resource development in forestry and biodiversity conservation, as well as the restoration of the Aral Sea landscapes involving GEF resources.

Further, the Uzbek delegation took part in the III Uzbek-Turkish Meeting on Forestry. The Turkish side was represented by specialists from relevant ministries and departments under the leadership of Deputy Minister of Agriculture and Forestry of Turkey Veysel Tiryaki. The parties discussed further expansion of fruitful cooperation on the exchange of experience in combating forest fires, arrangement of nut and fruit plantations, restoration of mountain forests, planting forests around water bodies, conservation of forest biodiversity, as well as improvement of legislation in the field of forestry.

In Ankara, the delegation met with Viorel Gutsu, FAO Subregional Coordinator for Central Asia. During the meeting, Nizomiddin Bakirov, chairman of the State Forestry Committee of Uzbekistan, praised the efficacy of projects implemented by FAO in Uzbekistan and suggested steps to expand cooperation.

Scaling up seed production of high-yielding drought- and salt-tolerant crops in pilot districts of Uzbekistan

The project's key objectives include promoting favorable environment for increasing agricultural output by introducing new high-potential drought- and salt-tolerant crops in drought- and saline-prone regions of the country and by granting the necessary equipment to the project beneficiaries.

"Our goal is to expand seed production practices for high-yielding, drought- and salt-tolerant crops in project areas. The varieties awarded are highly resistant to drought and salinity and are sown using direct seed drills - this technology is a sign of quality and contributes to efficient resource conservation, improved soil fertility, and long-term yields. This will enable farms to maximize their income by selling certified seeds, as well as strengthen the fodder base and increase livestock productivity at the project sites.

Another batch of socio-economic assistance under the project was handed over in late November to farms and other project partners in the target areas in Bukhara and Kashkadarya regions of Uzbekistan. They were given 12,000 kg of winter wheat seeds, 6,000 kg of barley seeds, 2,500 kg of fodder pea seeds, 1,500 kg of safflower seeds, 1,700 kg of oat seeds, 2,000 kg of rye seeds, and 4,000 kg of triticale seeds.

The project team hopes that production of drought- and salt-tolerant crop seeds will be a booster for climate change mitigation in the region," said Muhammadjon Kosimov, National Project Manager for CACILM-2.

The Bukhara Institute of Natural Resource Management at the National Research University "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers" is among the seed recipients.

The project team also presented the beneficiaries with the new agricultural equipment expressing the hope that it will contribute to more efficient farming and increased crop production, saving labor, costs, and time.

To demonstrate successful resource-saving technologies, in September 2022, the project team held a Field Day at "Zhovli bobo ugli Bakhtiyor" farm in Kamashi district of Kashkadarya region. Here FAO experts demonstrated no-tillage sowing of winter wheat.

In particular, Guzor Korakul-chilik LLC of Guzar district, Kashkadarya region, received three motor cultivators and three mini haymowers; households of Bukhara district, Bukhara region, and Kamashi district, Kashkadarya region, received five motor cultivators and five drills.

An important component of the implementation of the CACILM-2 project is the improvement of knowledge and skills of rural residents, and the introduction of best practices in their activities. In doing so, particular emphasis is placed on the promotion of conservation agriculture.

Sowing was done at a depth of 5-6 cm under rainfed conditions.

Aziz Nurbekov, an FAO expert on drought and salinity risk prevention, shared with farmers the experience of Australian researchers in applying no-till technology. Two months later, the event participants evaluated the results and concluded that the sprouts of winter wheat sown using the no-till method were in excellent condition. The suggested sowing depth proved to be optimal in low rainfall conditions, as well as in emergency situations after heavy rainfall in October.

The project installed high-tech equipment at the soil laboratory of the Ministry of Agriculture of Uzbekistan

In late November 2022, the State Unitary Enterprise "Tuproqsifattahlil" under the Ministry of Agriculture of the Republic of Uzbekistan received high-tech laboratory equipment worth 29 thousand dollars.

The lab personnel appreciated the newest model of spectrophotometer, which will significantly improve soil research.

"Tuproqsifattahlil" works on assessing the quality of irrigated land, monitoring fertility and environmental status of soils. The information base of the republic's soil covers is generated here, as well as maps of soil salinity and nutrient availability. The company's specialists develop recommendations for reclamation and amelioration of saline and degraded lands.

In cooperation with the spectrophotometer manufacturing company, the project organizes trainings for the laboratory staff on operating the new equipment. In the future, they will also take part in other training courses organized by the project.

"We hope that the new equipment will take geochemical and environmental research to a new level. The device allows you to determine the chemical composition and quality of the soil with high accuracy and maximum speed. Without an accurate analysis of the chemical composition of the soil, it is impossible to make the right choice of methods for its reclamation and selection of suitable fertilizers, as well as to study the sources of chemical pollution of the land," said **Muhammadjon Kosimov, National Coordinator of the CACILM-2 project in Uzbekistan** at the equipment hand-over ceremony.

Supported by digital technologies, agriculture can become a driving force for both economic recovery and improving the quality of life, particularly for smallholders and farmers.

President of the Republic of Uzbekistan Shavkat Mirziyoyev initiated a large-scale program "Digital Uzbekistan-2030" in 2020, which provides for fundamental digital transformation of the country over the next 10 years.

It should be noted that supporting the application of technologies aimed at preventing agricultural land degradation, preservation, and improvement of soil fertility in arid and saline areas is one of the key objectives of the project.

International cooperation plays a key role in the implementation of integrated management of natural resources. Within the framework of the project, extensive activities are being carried out to train farmers, improve the skills of specialists of agricultural organizations and research institutions.

Drought-resistant saffron introduced in Uzbekistan

The Oltinboyev Yeri farm in Kamashi district, Kashkadarya province, in Uzbekistan recently harvested saffron for the third time.

Saffron is a relatively new crop for Central Asia in general and Uzbekistan in particular. The technology of cultivation and reproduction of this crop is currently only being explored.

In 2019, the Oltinboyev Yeri farm, with advisory support from the project, began growing crocuses, the stamens of which are used to produce saffron.

To test the breeding and cultivation technology to produce a very expensive spice in rainfed and very arid climate, the project gave this farm several dozen saffron bulbs, which the farmer planted on an area of about 20 m2.

Today, the farm owns the precious plant's bulbs to cover an area of 100 square meters, which means the planting area has increased fivefold in three years.

In addition to expanding the area under saffron, the farmer will also distribute the bulbs to other farmers and explain their cultivation techniques.

The farm has been cooperating with the project since the beginning of its activity in the country.

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