The activities across the country were held jointly with Zamin Foundation

On October 15th 2021, on the occasion of World Food Day, Food and Agriculture Organization of the United Nations (FAO) jointly with Zamin Foundation organized a large-scale Campaign on Healthy Diets and Rational Use of Soil at specialized school No.102 for children with difficulty of hearing in Tashkent. Similar activities were held in schools all over the country including more than 15 thousand children.

Children attended presentations on proper nutrition and rational use of soil. They also engaged in workshops on the use of greenhouses and preparation of healthy food. The event was concluded with an entertainment program.

The event also hosted the official launch of the new Young Farmer project of the Zamin Eco-Education program initiated by the Zamin Foundation, FAO, the Ministry of Public Education of Uzbekistan, the Ministry of Agriculture of Uzbekistan and the Agency of Presidential Educational Institutions. Project participants have the opportunity to gain practical skills on biodiversity and proper nutrition.

This way, during October 2021, 22 greenhouses had been installed in schools all over the country. Moreover, the children received the necessary equipment for practical activities.
“Environmental education is an important factor for ensuring sustainable development and increasing everyone’s responsibility in the rational use of natural resources. Ultimately it forms the environmental awareness of the society. At the same time, nutrition education from an early age allows to make a choice in favor of healthy food in the pathway to strengthening the population’s health, eradicating hunger and improving food security. In this regard, the implementation of this project is very important and fully complies with the Sustainable Development Goals”, — Sherzod Umarov, Assistant FAO Representative in Uzbekistan stressed.

The greenhouses were handed over to schools on a grant basis within the framework of the FAO project on Integrated natural resources management in drought-prone and salt-affected agricultural production landscapes in Central Asia and Turkey (CACILM-2). These greenhouses will be utilized to provide classes for pupils to improve their capacities on environmental protection agriculture and rational use of natural resources.

Students of specialized school No.102 for children with difficulty of hearing celebrate the World Food Day

Greenhouses bring income and hope to rural people

A greenhouse opens up great income-generating opportunities for vulnerable households to improve their livelihoods throughout the year. Producing certain crops during early spring and late autumn, greenhouse owners will be able to meet the demand of the local community for fresh vegetables and greenery in low agricultural season thereby getting a stable source of income.

This is why in December 2021 FAO granted 40 greenhouses to rural people of Bukhara (Bukhara district) and Kashkadarya (Kamashi district) regions to ensure more efficient use of their household plots. The beneficiaries were selected from vulnerable rural communities on the recommendations of the local khokimiyat (municipality).

The support was provided within the framework of CACILM-2 regional project implemented in Uzbekistan by FAO in cooperation with the Ministry of Agriculture, State Forestry Committee and State Committee on Ecology and Environmental Protection.

It is important to note that within the framework of the CACILM-2 during 2021 a total of 108 greenhouses were allocated to beneficiaries, including greenhouses granted to schools and kindergartens under the aforementioned Young Farmer project.
Rural households receive modern agricultural equipment

FAO Representation in Uzbekistan handed over 20 motor cultivators, 30 water pumps, 20 knapsack sprayers and 10 pit drills to the rural households of pilot regions.

Handing over process in Bukhara region

The support was provided within the framework of CACILM-2 project for enhancing more efficient use of land and for providing higher incomes for rural people.

The new agricultural equipment granted to the beneficiaries will ultimately increase the incomes of their families by enabling them to manage their household plots more efficiently and reduce labor costs.

Another key objective of CACILM-2 project is supporting scientific institutions. In this regard, the Bukhara Research and Production Center for Seed Production of Steppe Pasture Fodder Plants received the latest laboratory equipment, in particular, laboratory scales, an anemometer, a drill, a refractometer, as well as a motor cultivator and a mower.

Improving agrometeorological services in Uzbekistan

In order to support INRM-activities in the scope of CACILM-2 project FAO granted 12 innovative agrometeorological stations to the Center of Hydrometeorological Service of Uzbekistan (Uzhydromet) to strengthen the technical capacity of this institution and modernize the systems for providing meteorological information. The agrometeorological stations were installed in the agricultural areas of Jizzakh and Kashkadarya regions.

Special trainings on the use of new automatic agrometeorological stations were organized for specialists of the Jizzakh and Kashkadarya regional departments in hydrometeorology.

“The agrometeorological stations will be used to get the necessary meteorological information for farms in the project areas. Timely and high-quality provision of the necessary meteorological information allows to ensure efficient and sustainable management of natural resources, to reduce crop risks by making appropriate decisions regarding crop planting, pesticide application and more”, - the national project manager Muhammadjon Kosimov stated.
FAO supported the reconstruction of a well in the arid district of Kashkadarya region

Placing drinking wells for livestock evenly throughout the area is important to avoid the overuse of pastures. However, as many wells in desert and semi-desert pastures become unusable over time, their restoration is a rather difficult and costly process for shepherds. The FAO/GEF regional project CACILM-2 aided the renovation of a well located near the village of Takham, Guzar district, Kashkadarya region, which in turn provided a great support for local livestock breeders.

In total, karakul breeders keep more than 3 thousand sheep. The mentioned well is the only source of water used for agricultural purposes in this settlement. The repair work took more than two months. Today, when the well is operational, shepherds can receive up to 40 cubic meters of water per day. Therefore, the load on other areas for grazing livestock will be reduced.

Inception workshops on FAO projects were held in Tashkent

The Inception Workshop was held within the framework of the project “Strengthening sustainable food systems through geographical indications” that is implemented by FAO and the Ministry of Agriculture of Uzbekistan. At the event national and international experts presented the goals and objectives of the project, including introduction of GIS practices for the selected products through awareness raising campaigns and capacity building measures, developing and implementing an effective GI marketing strategy, etc.


An inception workshop was held on the project “Rice Crop Production and Management Support” implemented by FAO in cooperation with the Ministry of Agriculture of Uzbekistan. According to FAO experts, the project is focused on developing the country’s rice sector, improving the value-added chain and hence process more of its own rice for domestic consumption, reducing rice imports, and promoting export.

“The project will contribute to the development of sustainable rice production in Uzbekistan by introducing improved production technologies. This project will also allow to enhance knowledge and skills of some rice farmers and national experts. Training of the Ministry’ staff and farmers in improved rice production and management practices within the selected communities will ensure locally available technical support and will have a long-term effect to increase local rice production”, - Viliami Fakava, FAO plant production and protection officer.
Tashkent hosted the International Conference on Cold Winter Deserts

On December 2-3, 2021, the first International Conference on Cold Winter Deserts was held in Tashkent within the framework of the Central Asian Desert Initiative (CADI). It was organized by FAO, the State Forestry Committee of the Republic of Uzbekistan and the Ministry of Agriculture of the Republic of Uzbekistan in cooperation with the University of Greifswald (Germany) and the Michael Succow Foundation.

Bringing together the researchers, academia, scientific institutions as well as stakeholders, students from local and international universities, representatives of international organizations, the conference was set to become a platform for discussing options for the development and conservation of the temperate desert territories, as well as to raise awareness of advanced technologies for sustainable land management, disseminating knowledge about biodiversity conservation in ecosystems of temperate desert zones.

The temperate deserts of Kazakhstan, Turkmenistan and Uzbekistan are among the regions of Central Asia that are of global importance for the conservation of biodiversity and, according to the International Union for Conservation of Nature, can claim the status of world heritage sites. These unique landscapes support the existence of rare species of animals, including wild gazelles, kulans and urials. They also serve as important nesting and migration sites for bird species such as burial eagle, bustard and saker falcon. And these territories are the target countries of the Central Asian Desert Initiative.

The CADI project, funded by the German government, is being implemented since 2016 by the University of Greifswald, the Michael Succow Foundation and FAO.

“Central Asia is a global biodiversity hotspot located in the heart of Earth’s largest continent. It features unique habitats, breeding grounds, migration corridors and flyways for many rare and endangered animal species. The CADI project aims to conserve and ensure the sustainable use of temperate deserts, which are unique ecosystems of global importance”, - said National Coordinator of the CADI project Nariman Nishanov.

The project supports communities involved in agriculture in the harsh conditions of the temperate deserts. In particular, project activities include provision of equipment for wool processing, sewing, dairy processing, beekeeping, as well as the distribution of seeds and seedlings to farmers and smallholders. Furthermore, the CADI project conducts an extensive training program on the cultivation of crops, supports the development of handicrafts for women, the creation of nurseries in greenhouses, and the development of beekeeping.

It should be stressed that in December 2021, the office of the Interim Regional CADI Secretariat was officially launched in the premises of the State Forestry Committee of the Republic of Uzbekistan.

Earlier, in October 2021, an Inception Workshop was held within the CADI project. The main objective of the virtual meeting was to ensure participation of stakeholders and to include their views and comments for elaboration of the CADI Secretariat’s plan of work.
Rural women are engaged in alternative income-generating activities

Within the framework of the CADI project FAO organized trainings for rural women living in project areas – in the village of Chuya in the Nurata district of Navoi region and in the village of Durmon in the Karakul district of Bukhara region.

“Gender equality and empowerment of women play an important role in the mandate of our organization. FAO is engaging women in alternative income-generating activities to improve their families' livelihoods, which in turn will reduce their dependence on grazing and other agricultural activities in cold winter deserts. The workshop also facilitates the revival of traditional crafts, because there is always a high market demand for products of national applied arts”, - Nariman Nishanov, National Coordinator of the CADI project in Uzbekistan said.

Training participants in Navoi region

The workshops were attended by 50 women who were selected from vulnerable communities. New knowledge and skills will enable them to generate additional income from handicrafts for improving livelihoods of their families.

The classes were conducted by experts in embroidery and traditional crafts. One of them is Matlyuba Bazarova, Vice–President of the Central Asian Crafts Support Association. She advised the participants about the benefits available in the country to support artisans, how to start a business, and also shared her experience and knowledge about the basics of marketing and creation of intra-household jobs. During the three workshop days, rural women also learned the basics of sewing, national embroidery and making wool blankets.

Workers of Kitab State Forest Organization participate in FAO Tree Planting Campaign

Creating Tomorrow's Forests

Within the framework of the FAO/GEF project “Sustainable Forest Management in Mountain and Valley Areas of Uzbekistan”, implemented with the support of the State Forestry Committee of Uzbekistan, large-scale work was carried out to plant seedlings in Uzbekistan. By this FAO contributed to the implementation of the nationwide “Yashil Makon” program initiated by the President of the Republic of Uzbekistan Shavkat Mirziyoyev. In particular, mountain terraces, fuel wood plantations and nurseries of seedlings and cuttings were created in Pop, Syrdarya, Kitab and Dekhkanabad state forest organizations. In addition, thousands of seedlings were handed over to the local people by FAO to create green spaces in their household plots. At the same time, special workshops were held for forest workers, providing them the opportunity to gain new knowledge and skills in the agrotechnics of planting trees, working on household plots, developing forests and pastures.

In 2021 the project initiated forest plantations were created in total area of 1220 hectares and more than 265 thousand seedlings four pilot plots.

Seedlings for distribution in the Pop State Forest Organization
International experts discussed the Strategy for Gender Equality at a conference in Tashkent

FAO together with the State Forestry Committee of the Republic of Uzbekistan organized an international conference on “Implementation of the Strategy for Gender Equality in the Forestry System of Uzbekistan”.

In close cooperation with FAO, Uzbekistan has introduced the principles of gender equality in forest management policies and practices. One of the biggest achievements is the development of the first long-term, budgeted Corporate Gender Strategy of the State Forestry Committee of the Republic of Uzbekistan for 2021-2025. The implementation of this strategy contributes to the implementation of the Presidential Decrees of the Republic of Uzbekistan “On additional measures to improve the efficiency of forest management in the Republic” and “On approval of the Forestry system development concept of the Republic of Uzbekistan till 2030”.

The document was developed within the framework of the FAO project “Sustainable forest management in mountain and valley areas of Uzbekistan” based on international best practices, taking into account the opinions of representatives of ministries and departments, public organizations and stakeholders. The legal basis for the development of the document was the Laws of the Republic of Uzbekistan “On guarantees of equal rights and opportunities for women and men”, “On protection of women from harassment and violence”, as well as on the National Sustainable Development Goals.

“During 2019 - 2021, we conducted a gender analysis in the forestry of Uzbekistan, where gaps and shortcomings of the legal framework were identified. Based on this information, the Gender Strategy and the Action plan of the State Forestry Committee for 2021-2022 were developed, reflecting the main priorities and needs of communities highly dependent on forests”, said Olimjon Kakhkharov, the technical coordinator of the project.

When implementing the FAO/GEF project “Sustainable Forest Management in Mountainous and Valley Regions of Uzbekistan”, special attention is given to mainstreaming gender into forest management. In this regard, in October-November 2021, a series of workshops were held for workers of the Syrdarya, Dekhkanabad, Kitab and Pop state forest organizations. The workshops were held to present the Gender Equality Strategy of the State Forestry Committee of the Republic of Uzbekistan for 2021-2025. The events also elaborated on gender council workplans established in each forestry organization.
FAO handed over special vehicles to the forestry organizations of Uzbekistan

FAO handed over special NIVA off-road vehicles to the Pop, Dehkanabad and Kitab forestry organizations within the framework of the project “Sustainable Forest Management in Mountain and Valley Areas of Uzbekistan”. Special off-road vehicles were purchased by FAO to solve the issue of transportation in hard-to-reach mountain regions when performing the tasks of the project.

Also within the framework of the project, in cooperation with the State Forestry Committee of the Republic of Uzbekistan, another NIVA off-road vehicle was transferred to the Ugam-Chatkal National Natural Park in order to support the processes of monitoring and protection of the mountainous regions of the Tashkent region.

Promoting organic agriculture in Uzbekistan

FAO conducted series of trainings on organic agriculture for farmers, exporters and other representatives of the agri-food sector in Andijan, Samarkand and Khorezm regions as well as in Tashkent. The classes were conducted by international experts who shared the best foreign experience. The trainings were organized within the framework of the project “Improvement of legal framework and institutional capacity to promote organic agriculture in Uzbekistan” implemented by FAO and Ministry of Agriculture of Uzbekistan.

“The introduction and development of organic agriculture in Uzbekistan will enhance the health of soils, ecosystems and people. Synthetic fertilizers and pesticides, genetically modified seeds and breeds of livestock have a negative impact on the environment. All these methods are replaced in organic agriculture by special practices that preserve and increase soil fertility, prevent the reproduction of pests and the growth of diseases” – Furkat Ibragimov, coordinator of the project stressed.

FAO supported the Honey Festival

From December 1 to 10, 2021, the Association of Uzbekistan Beekeepers with the support of FAO hosted the Honey Festival exhibition-fair in Ankhor Park, where one could taste the whole variety of bee products produced in Uzbekistan.

More than 100 varieties of honey from all regions of Uzbekistan were presented at the fair. Visitors had the opportunity to not just taste and purchase different varieties of honey, but also to learn more about beekeeping, thanks to the workshops held for industry representatives with the participation of international experts. During the workshops two Innovative Platforms were presented: (1) the mobile application “The Encyclopaedia of beekeeping” and (2) the information exchange system “Arizor.uz”.

The workshops were held not only in Tashkent, but also in Fergana and Samarkand. The workshops addressed such issues as intensive technologies in the use of bee arbors, organization of an accounting system that reflects the effectiveness of beekeeping, technologies for the industrial cultivation of queen bees, the procedure for exporting honey and the requirements of foreign countries for the quality of honey, the procedure for treating bees and using medicines, new technologies in the world beekeeping.
Smart Farming for the Future Generation

As part of the FAO project “Smart Farming for the Future Generation”, from October 31 to November 13, 2021, the FAO international expert on agriculture Melvin Medina Navarro visited Uzbekistan with a mission.

Implementing the mission, Melvin Medina Navarro conducted a full course of trainings on greenhouse management. The trainings addressed safe crop production practices, sanitary and restrictive measures, water and plant nutrition management, efficient tillage and integrated pest and disease management. Trainings were attended by the officials of the Ministry of Agriculture of the Republic of Uzbekistan and the Horticulture and Greenhouse Development Agency as well as by project beneficiary farmers. During the visit, the FAO expert also visited beneficiary farmers in the pilot zones of the “Smart Farming for the Future Generation” project in Andijan, Namangan and Fergana regions.

Introducing advanced technologies in greenhouse management under the project “Smart Farming for the Future Generation” enhances productivity, climate control, and ensures sustainable use of water and soil resources as well as improves pest and disease management. Advanced technologies can provide an opportunity to grow year-round a wide range of crops with high nutritional values. That’s why implementation of this project will increase national capabilities on greenhouse production, post-harvest and food safety management of vegetables.

HIGHLIGHTS

Research work carried out within the framework of the project showed that vegetable growing is one of the main sources of income for the rural population of the Ferghana Valley. Local farmers grow vegetables and herbs in their gardens and greenhouses from early March to the end of November.

Of the 206 mahallas in Ferghana (77), Andijan (76) and Namangan (53) districts of the same-named regions of Uzbekistan, 15 mahallas were selected as target areas for the project, where, in accordance with the work plan for 2021, the selection of direct beneficiaries was carried out.

By the beginning of 2022, 20 low-income households (owners of greenhouses) have been selected. The goals and objectives of the project were explained in detail to the beneficiaries, plans for the future were discussed. Currently, a number of measures are being implemented to modernize the selected greenhouses, in particular, the process of purchasing modern equipment is underway.

FAO implements the global food security standard in Uzbekistan

On December 16, 2021, FAO together with The State Committee of the Republic of Uzbekistan on Statistics organized a workshop on the implementation of The Food Insecurity Experience Scale (FIES) in Uzbekistan. The Food Insecurity Perception Scale is a global standard for assessing people's experiences in food security issues. FIES is a reliable and cost-effective indicator for assessing people's access to food. This survey is considered more cost-effective and easier to include in national household surveys than other food security and nutrition indicators. By 2017, 22 countries have already included FIES in their national household surveys.

During the workshops specialists presented detailed analysis of the results of sample surveys conducted using the FIES module in the households in Uzbekistan for July-December 2021.
FAO signs new agreements in Uzbekistan

FAO signed a Partnership Agreement with Westminster International University in Tashkent (WIUT) on the “Technical implementation of the Price and market information system and related policy analysis for selected agricultural value chains in Uzbekistan”. The project is supported by the Center for Policy Research and Outreach (CPR) of WIUT.

Assistant FAO Representative in Uzbekistan Sherzod Umarov and WIUT Rector Bakhrom Mirkasimov took part in signing ceremony

Agricultural price and market information systems (MIS) can play a very important role in promoting agricultural development, especially for agricultural small-holder and food producers. Sound market information can help to enhance transparency, competitiveness and the more equitable sharing of benefits among key players in the marketing systems and promote the sustainable food value chain development. Additionally, MIS can make a significant contribution towards improving food security and nutrition, by enabling the identification of price trends that may signal emerging food problems and cost and affordability of nutritional and healthy diets, whether relatively short-term deficits or longer-term structural problems. A good MIS is also useful in enhancing governments’ capacity to take appropriate policy and planning decisions in support of agricultural growth.

In 2021, an agreement was also signed with the Tashkent State Agrarian University as part of the FAO/GEF project “Sustainable Forest Management in Mountain and Valley Areas of Uzbekistan”. As part of the agreement, FAO will provide financial support to the University to carry out the tasks of developing Strategic rehabilitation plan for restoration of degraded forests, sustainable pasture management, creation of plantations, development of non-timber forest products in 4 pilot sites located in Namangan, Syrdarya and Kashkadarya regions.

According to the agreement, the University will develop technical specifications for the establishment of nurseries, plantations of non-wood forest products and processing infrastructure, as well as for the pasture and rangeland rehabilitation.

Within the framework of the FAO/GEF project “Sustainable Forest Management in Mountain and Valley Areas of Uzbekistan” an agreement was also signed with the Design Institute “Ormonloiyikha”, which is aimed at ensuring sustainable forest and pasture management. According to the document, FAO provides the institute with financial support for elaboration of Pilot multipurpose forest management plans for 4 pilot sites.

FAO implements best practices for brucellosis control in Uzbekistan

FAO in cooperation with the State Committee of Veterinary and Livestock Development of Uzbekistan organized a training on brucellosis control with participation of Dr. Jose Blasco, an international FAO expert on brucellosis. The training was attended by approximately 50 people, including the epidemiologists, laboratory staff and scientific personnel from veterinary research institutes and professors of Samarkand Institute of Veterinary Medicine.

The training was organized within the framework of FAO’s Technical Cooperation Programme “Establishing a Network on Priority Livestock Diseases in Central Asia”. This Programme aims to establish a regional network among five recipient Central Asian countries - on priority livestock diseases. As such brucellosis has been selected as an initial disease to focus preliminary regional network establishment given its cross-border dimension and high prioritization among all Central Asian countries.
FAO strengthens Uzbekistan's capacity for Locust Management

Locusts are the world's most dangerous migratory pest, which can travel 150 kilometers a day, huddle in swarms of 80 million individuals and eat as much plant food per day as the population of a large city. Locusts pose a serious threat to agriculture, food security and well-being around the world, as dangerous insects can destroy crops on millions of hectares and devastate large farms. Damage in such cases is estimated in millions of dollars.

Dealing with locust outbreaks is challenging as transboundary cooperation and specialized equipment are needed to kill newly emerging locusts, preventing them from breeding. Therefore, the Food and Agriculture Organization of the United Nations (FAO) implements the project for Improvement of Locust Management (Phase II), funded by the Japan International Cooperation Agency (JICA) for the benefit of five Central Asian countries.

Within the framework of this project, on December 27, 2021, FAO handed over 10 motorbikes, 14 tablets, 5 vehicle mounted sprayers, 400 goggles, 400 masks, 240 PVC gloves, 200 caps, 200 special jumpsuits, 100 boots, 200 books, 1000 information posters, etc. to the Agency of Plant Protection and Quarantine of the Republic of Uzbekistan to improve pest control processes.

An improved response mechanism to locust outbreaks is being introduced by FAO through the project, using less harmful pesticides and biological pest control products.

The Association of Uzbekistan Beekeepers receives new laboratory equipment

On December 24, 2021, FAO handed over modern laboratory equipment to the Association of Uzbekistan Beekeepers. The advanced equipment will be used for educational and demonstration purposes.

This equipment was provided within the framework of the FAO project “Support to sustainable apiculture development”, which is being implemented jointly with the Ministry of Agriculture of the Republic of Uzbekistan.

“With a skillful approach, beekeeping can become a good source of income, as well as solve the problems of employment of vulnerable groups, including rural women. The project is aimed at improving the knowledge and skills of beekeepers, introducing innovative technologies and advanced methods into the industry”, - says Sherzod Umarov, Assistant FAO Representative in Uzbekistan.

Since 2019, the implementation of this FAO project included the organization of workshops on topical issues in beekeeping development. In addition, to support the educational process in agricultural colleges, universities, as well as in the beekeeping centers of Tashkent and Fergana, practical recommendations on various aspects of beekeeping were prepared in Uzbek based on international best practices. One of the achievements of the project implementation was the development of an innovative information exchange system for beekeepers.
Rural people of the Aral Sea region learn innovations in agriculture

FAO conducted a series of trainings to strengthen agricultural capacities of the rural population of Karakalpakstan. The trainings were organized as part of a Joint Programme implemented by United Nations Development Program (UNDP), the United Nations Population Fund (UNFPA) and FAO aimed at strengthening adaptive capacity of vulnerable citizens of the Aral Sea region to address the difficulties of economic and food insecurity. The Joint Programme is funded by the UN Multi-Partner Human Security Trust Fund for the Aral Sea Region in Uzbekistan.

In particular, on December 15-16, 2021, trainings on horticulture were held jointly with the Association of rural Women of Uzbekistan. The trainings were attended mostly by women and youth. During the trainings rural people acquired skills on efficient use of degraded lands, mineral and organic fertilizers and agricultural technologies in horticulture on saline soils of household plots.

Further, on December 20-21, also in cooperation with the Association “Women of the Agrarian Sphere” of Uzbekistan, trainings on conservation agriculture were organized. Given the specificity of this region’s economy, where the majority of the rural population is employed in the agriculture sector,, the Joint Programme focuses on promoting innovative agriculture practices at the household levels and helping to build the skills of the target groups in order to productively use the land resources and increase the income of the rural households.

On December 24-25, trainings on aquaculture were organized for rural residents of the Bozatau district of Karakalpakstan. FAO’s national partner was the Scientific Research Institute of Fishery of Uzbekistan. Participants learned the prospects and scientific basis of the fishing industry, the composition of proper feeding for fish, the economic indicators of intensive fish farming. The participants of the trainings received answers to all their questions.

In addition to the Bozatau district, the project areas include the Muynak and Kungrad districts of Karakalpakstan, where trainings are provided on the topics mentioned, as well as on livestock development and water-saving technologies. Within the framework of the Joint Programme technical support will be provided to one fish farm in each of three districts for upgrading existing fishery ponds.