Science, Technology and Innovation Potential of the Regions of the Republic of Uzbekistan

Under the UNESCO/IsDB Project Strengthening the Inclusive Science, Technology and Innovation System in Uzbekistan

(UNESCO-IsDB project UNESCO Global Observatory of Science, Technology and Innovation Policy Instruments (GO→SPIN) towards strengthening inclusive Science, Technology, Innovation (STI) Systems for the Sustainable Development Goals)

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Authors:
Abdurakhmonov I.Yu., Tsoy A.I., Bobokhonov A.A., Aminov F.F., Nazirov S.J., Musaeva R.A., Salahodjaev R.Sh., Makarov S.E., Mirzaev Ch.G., Kadyrova F Sh., Gainulina K.T., Daliev A.Sh., Razhabov Kh.Ch., Akin A.Kh.

Contacts:
Deputy Director of the Center for Scientific and Technical Information under the Ministry of Innovative Development of the Republic of Uzbekistan
Nazirov Sardor Jamoliddinovich
Tel.: + 998 97 755 82 50
E-mail: s.nazirov.csti@mininnovation.uz
Address: The Republic of Uzbekistan
Tashkent, Almazar district
University town, 7

Normative control and design: Musaeva R.A.

Content

Foreword from the Minister of Innovative Development of the Republic of Uzbekistan

Today, Uzbekistan has taken bold steps to innovative development outlined by our President. Over the past few years, the State had made significant efforts to establish favorable conditions for the development of scientific and innovative activities.

A strong regulatory framework was established, reforms have been carried out that have significantly increased government spending on science and innovation. Work is actively underway to commission new infrastructure facilities and builds human resources. We open ourselves up with great alacrity to the world scientific community, constantly expanding and strengthening areas of cooperation with our foreign partners, international organizations and financial development institutions.

Last year, for the first time after a long break, our country was included in the rating of the Global Innovation Index. Uzbekistan ranked 93rd out of 131 (the last time in 2015, Uzbekistan ranked 122nd out of 140).

Given the rapid developments of the global economic developments, efforts by the Ministry of Innovative Development are focused on finding effective innovative approaches to solving complex problems and the country's readiness to meet new challenges. An extremely important condition for this, is the involvement of all participants in the innovation system.

The historically formed concentration of scientists in the capital of Uzbekistan, the city of Tashkent, entailed a significant lag in the regions. As a result, we have a low level of funding for scientific and innovative activities, weak staffing and infrastructure support across the regions

To solve this problem, the President has given clear instructions. The main innovation is the work to strengthen the functions for the development of science and innovation of regional administrations. Together with the Ministry of Innovative Development, regional governments will start holding competitions for funding scientific and innovative projects.

The analysis of the scientific, technical and innovative potential of the regions prepared by the Center for Scientific and Technical Information with the support of the UNESCO Office in Uzbekistan within the framework of the above work will serve as a basis for making clear decisions, as well as a basic document for measuring the progress and effectiveness of implemented policies.

Prof. Ibrokhim Yulchievich Abdurakhmonov

Description of the Project (Purpose and Objectives of the Study)

Analysis of Science, Technology, and Innovation Potential of the Regions of Uzbekistan within the framework of the UNESCO/IsDB Project *Strengthening the Inclusive Science, Technology and Innovation System in Uzbekistan* *(UNESCO-IsDB project UNESCO Global Observatory of Science, Technology and Innovation Policy Instruments (GO→SPIN) towards strengthening inclusive Science, Technology, Innovation (STI) Systems for the Sustainable Development Goals)*

At present, the IsDB member countries pay attention to the science, technology and innovation (STI) policy, because it plays a crucial role in achieving the Sustainable Development Goals. The IsDB in turn has been persistent in its working on the creation of favorable conditions for STI comprehensive systems, promoting the development of institutional and human potential, supporting entrepreneurship activities and youth involvement.

A new cooperation agreement signed between the IsDB and UNESCO for the development of a science, technology and innovation policy in Uzbekistan is aimed at strengthening the country potential in this field and supporting the Agenda for the period up to 2030.

In this regard, in addition to the basic material – *Mapping of Scientific Research and Innovation in the Republic of Uzbekistan* – a research is being conducted, which aims at an in-depth study of the current state, existing problems and opportunities to accelerate the STI development in the regions of Uzbekistan.

The main purpose is to determine the scientific & technological and innovative potential of each region of Uzbekistan and to develop appropriate proposals to the National STI Policy and key tools for their implementation.

To this end, the Center for Scientific and Technical Information at the Ministry of Innovative Development of the Republic of Uzbekistan provides for the following activities:

Conducting a poll. The National STI Policy and the STI Action Plan of the central state and local executive bodies will be backed up with reliable grounds in the form of findings of a detailed analysis and conclusions of the UNESCO international experts, formed according to the results of a special online poll. The poll is aimed at gathering information on specific gaps and opportunities of stakeholders in Uzbekistan in the STI field at the national and regional levels, both among the providers of scientific research results and innovative technologies and users, including representatives of the public and private sectors.

Technical visits. To obtain a clear understanding of the scientific & technical and innovative potential (current state, problems and ways to solve them), to study the existing infrastructure of universities and scientific organizations, as well as their readiness to implement the National STI Policy, it is planned to visit each region of the country. In addition to it, information is to be gathered on the financing of scientific research, implemented mechanisms for the commercialization of scientific research results, activities for the integration of science and industry in the region, and planned large-scale projects for the implementation of innovations.

Conducting training workshops and webinars. For research scientists at regional universities and research organizations, the Project provides training workshops and webinars to increase their publication

activities in foreign top-rated academic periodicals and participation in international grant programs for funding research projects. As part of these activities, research scientists will be provided with practical recommendations for the preparation of scientific publications and grant applications. To furnish high-quality training materials, the work will be performed with the participation of international experts.

Consulting. For the Project, the term '*inclusive*' means the participation of key stakeholders, not only in the formulation of policy, but also in activating required operations at universities and research institutions. The outputs and recommendations should have a strong impact on the government, the private sector and civil society with regard to contributing to the development of the National STI Policy and tools for its implementation. The fulfillment of this task will require coordination, consolidation and provision of feedback on the STI policy tools provided by the UNESCO experts.

Research Methodology

To prepare this review, a methodology based on collection, systematization, processing and analysis of primary and secondary data was used. Primary data were collected during visits to universities and scientific organizations, interviews with key stakeholders in the regions. The studied secondary sources of data and information include various reports, databases and legislative acts published by central state and local executive bodies, and international organizations.

In the process of preliminary preparation for the implementation of work on the project, letters were sent to the heads of regional administrations about upcoming visits by members of the expert group with a request to provide information about contact persons and prepare all the necessary information materials.

For processing the collected information, methods of frequency domain analysis and data fusion, elements of a systems approach (in integrating the data obtained during the study of various types of scientific documents in various aspects), comparative study, content analysis, statistical methods (in multidimensional processing quantitative data) were used.

General Information about Science and Innovation in Uzbekistan

In the current year, as a result of the work carried out by the Ministry of Innovative Development, Uzbekistan has been ranked 93rd out of 131 in the Global Innovation Index (by comparison, in 2015, Uzbekistan was ranked 122nd out of 140). The re-inclusion of Uzbekistan in the Global Innovation Index (GII) after a long break is one of the main and important changes for the country, the result of ongoing reforms, the policy of transparency and openness and a number of other positive changes in the innovation sector. In the GII, 80 indicators are used to evaluate a country's innovation potential and achievements. Uzbekistan has achieved positive results in such indicators as Institutions, Human Capital & Research, Infrastructure, Knowledge & Technology Outputs, and Creative Outputs.

The above mentioned achievements became possible due to the special attention the President has been paying to the issues of increasing the efficiency of innovative research activities in the country and the widespread introduction of research findings into production.

Since 2017, the country has adopted a number of legislative and regulatory documents providing for the development of science and innovation in the country. The most significant of them are:

1. Decree No. UP-4947 of the President of the Republic of Uzbekistan *On the Strategy of Actions for the Further Development of the Republic of Uzbekistan in 2017-2021* dated February 7, 2017;
2. Resolution No. PP-2909 of the President of the Republic of Uzbekistan O*n Measures for the Further Development of the Higher Education System* dated April 20, 2017;
3. Resolution No. PP-3365 of the President of the Republic of Uzbekistan *On Measures to Further Strengthen the Infrastructure of Research Institutions and the Development of Innovative Activities* dated November 1, 2017;
4. Resolution No. PP-3698 of the President of the Republic of Uzbekistan *On Additional Measures to Improve the Mechanisms for Introducing Innovations in economic branches and sectors* dated May 7, 2018;
5. Decree No. UP-5544 of the President of the Republic of Uzbekistan *On Approval of the Strategy of Innovative Development of the Republic of Uzbekistan for 2019-2021* dated September 21, 2018;
6. Law of the Republic of Uzbekistan *On Science and Scientific Activity* No. ZRU-576 dated October 29, 2019;
7. Resolution No.PKM-133 of the Cabinet of Ministers of the Republic of Uzbekistan *On Measures to Further Improve the Regulatory Framework for Scientific Research* dated March 9, 2020;
8. Law of the Republic of Uzbekistan *On Innovation Activity* No. ZRU-630 dated July 24, 2020.

The adopted regulatory documents serve as the basis for the development of scientific & research and innovation activities in the country, given that the accelerated introduction of modern innovative technologies in the economic domain, social and other sectors with the widespread use of the achievements of science and technology is crucial to the dynamic development of Uzbekistan.

The main task in this case is the full use of the potential of domestic science and ensuring the entry into the world market of modern technologies, including by transferring and commercializing research and development results.

The recently adopted law on innovation focuses on facilitating the attraction of investment in innovation, increasing the country's intellectual and technological potential, and creating a strong legal basis for the

implementation of innovations. At the same time, the law will ensure effective interaction of innovation areas and define the rights and obligations of innovators. Also, conditions are being created for forming a large-scale innovation infrastructure.

In order to fully implement the aforementioned areas, it is necessary, in a quality manner, to prepare reliable statistical data on science, research and development to conduct a further system analysis and draw up clear recommendations for making strategic management decisions at the top level of leadership of central state and local executive bodies, since this is extremely important in the processes of stimulating and monitoring the scientific and innovative development of the country.

The potential of domestic science and innovations should be assessed on an ongoing basis and to the highest standard, including (qualitative and quantitative) analysis of the state of these areas and trends in their further development, identification of strengths and weaknesses, risks and opportunities, monitoring the activities of scientific organizations and universities, improving the methods of analysis of the effectiveness and efficiency of research programs, projects, etc.

As known, innovative activities encompass scientific, technological, organizational, financial and commercial measures that lead to the creation of improved products or processes.

According to the data from the State Statistics Committee of Uzbekistan, the total R&D expenditures in 2019 amounted to 853.4 billion UZS, including 314.7 billion UZS in the public sector, 429.2 billion UZS in the business sector, 106.7 billion UZS in the higher education sector, 2.8 billion UZS in the private non-profit sector. Total R&D expenditures by branches of science, compared to last year, increased by 13.9%, amounting to 602.3 billion UZS, of which 387.0 billion UZS in natural and engineering sciences, 106.6 billion UZS in medical and agricultural sciences, and 108.7 billion UZS in humanities and social sciences.

The volume of sold innovative products by type of economic activity in 2019 amounted to 26,293.8 billion UZS. The highest rate was recorded in the manufacturing sector (53.4%).

At the same time, there is a huge gap in the country between the development of science and innovation in Tashkent – the capital city (67% of total R&D expenditures in 2019) and regions (33% of total R&D expenditures in 2019) (Annex 1). This indicates the need to take effective measures to narrow this gap, taking into consideration the huge human resources concentrated in the regions.

In this regard, the UNESCO Office in Uzbekistan, together with the Center for Scientific and Technical Information at the Ministry of Innovative Development of the Republic of Uzbekistan, has been the first in the country to initiate and conduct work on the analysis of the scientific & technological and innovative potential of the regions of Uzbekistan. The analysis results will make it possible to determine the current state of the development of scientific and innovative activities in the country's regions and develop targeted recommendations for strengthening their capacities in these areas.

OVERVIEW OF REGIONS

- Jizzakh Region
- Namangan Region
- Andijan Region
- Fergana Region
- Navoi Region
- Bukhara Region
- Kashkadarya Region
- Khorezm Region
- Surkhandarya Region
- Syrdarya Region
- Samarkand Region
- Tashkent Region
- Republic of Karakalpakstan

JIZZAKH REGION

Administrative center	Jizzakh
Administrative divisions	12 districts
KKhokim	Ergash Alibekovich Saliev
Area	20 500 km² (ranked 6th)
Population	1 395 500 people (ranked 11th)
Largest cities	Jizzakh, Galla-aral, Bakhmal
GRP output	15 211.9 billion UZS (ranked 12th)
GRP structure	Agriculture, forestry and fisheries – 39.1% Industry – 14.1% Construction – 8.1% Trade and services sector – 38,7%
Key Indicators of the Development of the Scientific & Technological Potential and Innovations in Jizzakh Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary education institutions	3
Number of institutions with a postgraduate education system	2
Number of doctoral/postdoctoral students	14
PhD/Ds applicants graduated	25/4
Number of institutions engaged in R&D	7
Size of R&D financing	1 424.7 million UZS
Number of employees engaged in R&D	182
Number of implemented technological innovations	97
Number of new technologies acquired by institutions	2

Background

Jizzakh was founded in the Samanid Era (the Samanids were one of the Iranian ruling dynasties that established the Samanid state in 875-999 CE). It was first mentioned by Arab geographers and travelers in the 10th century. Before the Arab conquest, the city was part of Ustrushana, an ancient country that was part of Sogd. In their stories about Alexander the Great's campaign in Bactria and Sogdiana, Ancient Greek chroniclers gave many interesting facts about places such as Kyropol and Gazo in the present Jizzakh region. Historians have proven that Kiropol was located in the modern Zaamin. As to Gazo, it is known from historical records that it was located between Samarkand and Tashkent.

Later, Jizzakh was part of the states ruled by Turkic dynasties – the Karakhanids and the Anushteginids-Khorezmshahs. In 1220, it was captured by the Mongols and became part of the Chagatai Ulus. In 1370, it became part of Amir Temur's Empire, and later – the state of Mirzo Ulugbek. This was the time of the development of handicrafts and agriculture. Near Jizzak, in Mirasmand, there was an international market.

People came here from all over the world to buy silk and woolen fabrics. Located in the mountainous territory, Jizzakh was a resting point for many travelers and merchants who travelled along the Silk Road.

Between the 16th and 18th centuries, the territory of the modern Jizzakh region was part of the Uzbek states of the Sheibanids and Ashtarkhanids – the Bukhara Khanate. From 1756 to 1866, the bekdom of Jizzakh was part of the Bukhara Emirate, helmed by the Uzbek dynasty of Mangyts. In 1866, Jizzak was conquered by the Russian Empire and became part of the Turkestan Governorate-General. From 1922 to 1991, the city was part of the Uzbek SSR (USSR).

Jizzakh region was the birthplace of the incumbent President of the Republic of Uzbekistan Shavkat Miromonovich Mirziyoyev (July 24, 1957, Zaamin district) and the Soviet party and state leader, writer Sharaf Rashidovich Rashidov (October 24, 1917, the city of Jizzakh), who led the Uzbek SSR as the First Secretary of the Central Committee of the Communist Party of the Uzbek SSR for 24 years.

Region's Economy

Transport corridors between Asian and European countries pass through Jizzakh Region. It borders on two countries simultaneously – Tajikistan and Kazakhstan (there are three customs checkpoints and seven customs warehouses). Also, Jizzakh lies on the way from the capital of Uzbekistan – the city of Tashkent – to Samarkand, Bukhara, and the fertile Fergana Valley. The geographic location is one of the most important factors in the development of the region's economy and the road infrastructure of the whole country. This allows the regional administration to implement projects aimed at creating large logistics hubs that will contribute to the further development of the region's economy.

The population of the region is small (1,395,500 people), but the share of economically active citizens is significant, which indicates the availability of labor resources necessary for development. The region has 17 mineral deposits, a significant amount of reserves of mineral resources. Most of them are used for the manufacture of building materials, but only 65 % of the total amount of these resources is being developed.

Traditional agriculture branches in the region are cotton cultivation, vegetable production, and fruit cultivation. The production infrastructure of agriculture is represented by 42 complexes of refrigerating chambers with an average capacity of 482 tons. The share of irrigated land is significant due to the developed irrigation system. It is planned to create drip irrigation for another 1,231 hectares of cotton plantations, and extend the plantations of orchards and vineyards to effectively utilize vacant lands. Particular attention will be paid to the development of livestock farms in Yangiabad, Zaamin, Gala-aral, Bakhmal and Farish districts, including fish farming and poultry farming.

Development of Scientific and Innovative Activities in the Region

Scientific and innovative activities in the region are carried out by three higher educational institutions. There are no research Institutes in Jizzakh Region.

1. Jizzakh Polytechnic Institute

Jizzakh Polytechnic Institute was founded in 1992 by the Presidential Decree dated February 28, 1992 and Resolution No. 12.125 of the Cabinet of Ministers of the Republic of Uzbekistan dated March 11, 1992 on the basis of the Jizzakh branch of the Tashkent Institute of Architecture and Civil Engineering, the Jizzakh branch of Tashkent Chemical and Technological Institute, and the Jizzakh branch of the Tashkent Institute of Design, Construction and Operation of Motor Roads. It is part of the organizational structure of the Ministry of Higher and Secondary Specialized Education of the Republic of Uzbekistan.

Rector	Alisher Kodirkulovich Usmankulov, D.Sc. in Engineering
Vice-Rector for Research and Innovationss	Sirojiddin Akhbutaevich Tavboev, Ph.D. in Engineering
Number of students	7,626
Number of teaching professors	406
of them, academic degrees are held by	115 (25 D.Sc. + 90 Ph.D.)
Faculties	1. Motor Transport 2. Engineering of Construction of Buildings and Structures 3. Building Materials 4. Industrial Technology 5. Service 6. Electromechanics and Communications Electronics 7. Chemical Technology and Engineering

The Vice-Rector for Research and Innovations S. Tavboev is a member of the Scientific and Technical Council for “Informatization and Information and Communication Technologies” of the Ministry of Innovative Development of the Republic of Uzbekistan, the head of the Building Materials and Products Department Associate Professor O. Berdiev is a member of the specialized council No. DSc 27062020T1101, at Tashkent Institute of Architecture and Civil Engineering. Besides that, A. Usmankulov, Yu. Khamidov and O. Turakulov are members of the Specialized Council for the Defense of Doctoral Dissertations.

Nine months into 2020, 4 senior lecturers of the Institute successfully defended their dissertations for the D.Sc. in Philosophy degree (Ph.D.). Another 8 professors and teachers are planning to defend their doctoral dissertations by the end of the year.

The work of the research scientist K. Karimova *Improving the Quality of Asphalt Pavement by Adding Crushed Tire Rubber in the Conditions of Uzbekistan* deserves special mention. The results obtained under the project have been realized into practice by the Pakhtakor District Unitary Enterprise of Public Roads in coating the road surface of the 4r32 motor road Yangiyer-Pakhtakor-Chimkurgan.

In total, this year, within the framework of commercial agreements concluded so that researchers of the Institute could work to solve the problems of enterprises in the real sector of the economy, more than 258 million UZS were transferred to its settlement account.

In general, the Institute carries out research activities in the following areas:

1) Issues of the development of energy efficiency technologies and the use of renewable energy sources.
2) Development of scientific foundations for ensuring the efficiency of road transport and road traffic safety.
3) Implementation of effective management mechanisms in the field of architecture and civil engineering and taking the quality of urban planning to a new level.
4) Substantiation of the strength parameters of reinforced concrete structures.
5) Development of engineering communications and industrial infrastructure.
6) Issues of introducing new information systems in the development of the region's economy.
7) Development of research and practical solutions for resource-saving technologies and technical means for agriculture.
8) Study of structural changes in chemical crystalline materials.
9) Development of natural resources in the Aydar-Arnasay lake system.

Within these areas, the Institute has developed 41 innovative and start-up projects to realize the creative, intellectual and entrepreneurial potential of youth, to create the necessary conditions for research activities therein.

Also, the Institute has the Department of Research and Innovation Results Commercialization, which focuses its efforts on strengthening collaboration with industrial enterprises, attracting investors, partners and other stakeholders for the joint production of innovative products.

In 2020, research activities carried out at Jizzakh Polytechnic Institute resulted in:

- obtaining 11 documents of title for computer programs and 4 Certificates of Research Results Implementation;
- publishing 114 monographs, 644 academic papers, including 33 articles in journals indexed by the international Scopus database;
- publishing 290 papers in foreign academic periodicals;
- publishing 374 papers in journals included in the List of the Higher Attestation Commission;
- publishing 455 papers in the proceedings of local conferences;
- publishing 492 papers in the proceedings of international conferences.

The Institute actively participates in programs of the European Union in the field of higher education Erasmus+ and those of the Academic Innovation Fund established by the World Bank. However, there are no

research or innovative projects financed by the Ministry of Innovative Development of the Republic of Uzbekistan or foreign funds and international grant programs.

2. Jizzakh State Pedagogical Institute

The Institute was founded on the basis of Decision No. 605 of the Council of Ministers of the former USSR dated July 26, 1974. According to Decision No. 451/27 of the Executive Committee of People's Deputies of Syrdarya (current Jizzakh) Region dated December 21, 1989, the Institute was named after Abdulla Qadiri. The Institute is part of the organizational structure of the Ministry of Higher and Secondary Specialized Education of the Republic of Uzbekistan and prepares qualified teachers and researchers for the educational system of the region.

Rector	Shavkat Safarovich Sharipov
Vice-Rector for Research and Innovationss	Gayrat Urokboevich Kodirov
Number of students	13,581
Number of teaching professors	571
of them, academic degrees are held by	169 (20 D.Sc. + 149 Ph.D.)
Faculties	1. Mathematics and Physics 2. Natural Sciences 3. Uzbek Language and Literature 4. Russian Language and Literature 5. Pedagogy and Psychology 6. Preschool Education 7. Primary Education 8. Foreign Languages 9. History 10. Fine Arts and Manual Training 11. . Physical Education

By the decision of the Higher Attestation Commission under the Cabinet of Ministers of the Republic of Uzbekistan dated June 5, 2020, the Scientific Council awarding academic degrees in 3 specialties in philology and 1 specialty in pedagogics was created at the Institute. Besides that, research is carried out by basic doctoral students and independent researchers in 9 specialties.

Nine months into 2020, 23 (2 DSc and 21 PhDs) doctors of sciences (DSc) and doctors of philosophy (PhD) were prepared, and 6 academic titles were awarded.

In 2020, research activities carried out at Jizzakh State Pedagogical Institute resulted in:

- obtaining 10 documents of title for computer programs and 1 Certificate of Research Results Implementation;

- publishing 12 monographs, 69 academic papers in journals indexed by the international Scopus database;
- creating 8 textbooks and 26 teaching aids, which were approved by the Coordination Council under the MHSSE of the Republic of Uzbekistan and introduced into the educational process;
- publishing 328 papers in foreign scientific journals;
- publishing 855 papers in the proceedings of local conferences;
- publishing 748 articles in the proceedings of international conferences.

The Ministry of Innovation Development of the Republic of Uzbekistan funds a two-year (2019-2020) Project - *The Creation of innovative Plantations on Saline and Arid Lands of the Desert Regions of Uzbekistan (Ferula foetida, Bunge, Regel), Supply of New Seedlings* amounting to 923.6 million UZS. The project manager is U. Rakhmonulov, D.Sc. in Engineering.

The researcher D. Bakhriddinova is in charge of implementing the international project I*mproving English Language Teaching* funded by the US Embassy in Uzbekistan, totaling 45.0 thousand US dollars. The Project is to be implemented in 2020-2021.

In general, the Institute carries out research activities in the following areas:

1) Creation of multimedia products for the educational process, interactive electronic teaching aids in various disciplines.
2) Creation of geographic information systems.
3) Development of technologies for growing medicinal plants.
4) Development of technologies for landscaping desert areas.

Also, the Institute has developed 20 start-up projects to realize the creative, intellectual and entrepreneurial potential of young people, to create the necessary conditions for research in then above areas.

3. Jizzakh Branch of the National University of Uzbekistan

The Jizzakh Branch of the National University of Uzbekistan named after Mirzo Ulugbek was created by order of President of the Republic of Uzbekistan Sh.M. Mirziyoyev during his visit to Jizzakh Region on January 30-31, 2019, on the basis of Resolution No. 563 of the Cabinet of Ministers of the Republics and Uzbekistan dated July 5, 2019 and Resolution No. 261 of the KKhokim of Jizzakh Region dated July 10, 2019.

Director	Olim Kholbutaevich Turakulov
Deputy Director for Research and Innovations	Akmal Rustamovich Akhatov
Number of students	900
Number of teaching professors	45
of them, academic degrees are held by	10 (4 D.Sc. + 6 Ph.D.)
Faculties	1. Psychology 2. Applied Mathematics

JIZZAKH REGION

The National University of Uzbekistan is part of the organizational structure of the Ministry of Higher and Secondary Specialized Education of the Republic of Uzbekistan.

At the Jizzakh Branch of the National University of Uzbekistan, by Decision No. 4/2 of the Board of the Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan dated October 15, 2019, a basic doctoral program for the specialties: 05.01.02 - *System Analysis, Management and Information Processing*, 05.01.04 - *Mathematical Tools and Software for Computers, Complexes and Computer Cetworks*, 13.00.05 - *Theory and Methods of Vocational Education.*

NAMANGAN REGION

Administrative center	Namangan
Administrative divisions	11 districts
KKhokim	Shavkatjon Shokirjonovich Abdurazakov
Area	7 440 km² (ranked 9th)
Population	2 834 700 people (ranked 6th)
Largest cities	Namangan, Chust, Pap
GRP output	23 239 billion UZS (ranked 8th)
GRP structure	Agriculture, forestry and fisheries – 45% Industry – 15% Construction – 6.9% Trade and services sector– 33.1%
Key Indicators of the Development of the Scientific & Technological Potential and Innovations in Namangan Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary education institutions	3
Number of institutions with a postgraduate education system	3
Number of doctoral/postdoctoral students	52
PhD/Ds applicants graduated	15/8
Number of institutions engaged in R&D	9
Size of R&D financing	8 424.9 million UZS
Number of employees engaged in R&D	214
Number of implemented technological innovations	140
Number of new technologies acquired by institutions	1

Background

The first information about the settlement of Namangan dates back to the end of the 14th century. Officially, the history of the city of Namangan begins in 1610. It arose on the site of the settlement named “Namak-kan”, which is “a salt mine” or “salt works” in Tajik. On the territory of Namangan Region, in the northern part of Chust, archeologists found whole areas related to the culture of the population of the 1st millennium B.C.E. In the 4th – 3rd centuries B.C.E., during the existence of the Kushan kingdom, the city turned into the capital, where the economy and crafts were developed. In the 3rd century B.C.E., the big city Shakhristan – Akhsikent was built on the territory of the present Turakurgan Region on the banks of the Syrdarya River. The city had large fortresses. The Mongol invasion under the leadership of Genghis Khan resulted in the destruction of the city. Akhsikent, however, was rebuilt as early as during the reign of Amir Temur. Akhsy is the famous “ancestor” of Namangan.

Such famous thinkers of the East as Mavlono Alauddin Abubakr Ibn Mahsudiy Kosoniy, Said Ahmad ibn Mavlono Jamoliddin Mahdumi Azam, Mavlono Lutfulloh, Firdavsi, Babur, Mashrab, who told about the life and culture of the local population in their works, lived and worked in Namangan.

During the period when Namangan was part of the Kokand Khanate, the city was considered a major center of artisans and handicraftsmen, including potters, weavers, coppersmiths, blacksmiths, dyers, jewelers, cloth-printers, shoemakers, etc. Part of the population of Namangan was engaged in gardening, silkworm breeding and trading with China, Bukhara, and neighboring nomadic tribes.

In February 1876, the Kokand Khanate was liquidated and annexed to Russia under the name of Fergana Region, and Namangan became one of the centers of the five districts of this region. Having become part of the Russian Empire, Namangan was a significant trade center. Ginning was an important branch of industry at that time.

By 1930, Namangan had already had 17 primary schools and 2 higher schools: a seven-year school and a nine-year one. In addition, there were 307 illiteracy eradication schools, 2 kindergartens, 2 orphanages, and 6 playgrounds. A pedagogical college and a medical workers' faculty worked in the city.

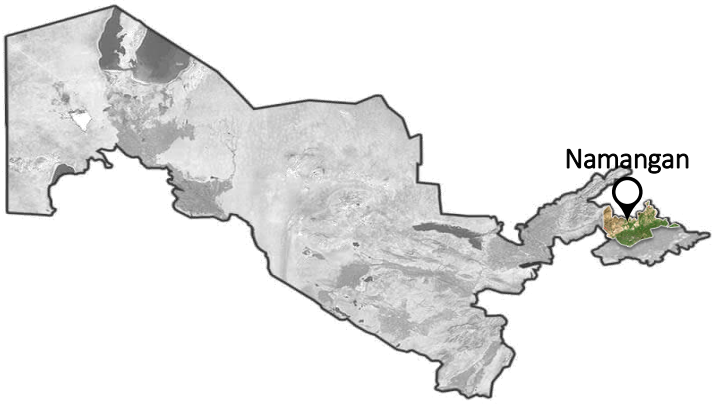
On June 15, 1932, on the initiative of Hamza Khakim-zade Niyazi, the Regional Music and Drama Theater named after Alisher Navoi was created. The theater continues its activities. In addition, Namangan used to house the USSR-wide Design Institute GIPROIV and the All-Union Scientific Research Institute of Artificial Fiber VNIIV.

On March 10, 1941, the Presidium of the Supreme Soviet of the USSR adopted a Decree on the formation of Namangan Region, and Namangan became its administrative center.

Region's Economy

Railway lines connecting the cities of Pap and Angren pass through Namangan Region. The construction of the Pap-Namangan railway link is currently underway.

Silk and textile production, shoe making and cotton processing are developed in the region. The main agricultural products of Namangan Region are wine, cotton, fruits and raw materials for silk production.



There is also one of the largest automotive repair shops, chemical plants and electromechanical enterprises, fruit dehydration plants.

Of the folk crafts, the Chust factory for the manufacture of Uzbek national knives should be noted. Chust knives are very popular with tourists.

Development of Scientific and Innovative Activities in the Region

Research and innovative activities in Namangan Region are carried out by three higher educational institutions. There are no research Institutes.

1. Namangan State University

Namangan State University was founded in 1941 as a teacher's training school. Later on, it was transformed into the Pedagogical Institute, and in 1992, the establishment was granted with the status of a university. Currently, the University has 9 faculties and 29 departments. In 2021, the number of faculties and departments will increase up to 15 and 40, respectively. The University is part of the organizational structure of the Ministry of Higher and Secondary Specialized Education of the Republic of Uzbekistan. At the University, there are three vocational schools.

Rector	Sobitkhon Toshpulatovich Turgunov, D.Sc. in Pedagogical Sciences
Vice-Rector for Research and Innovationss	Murodkhon Murodkhonovich Kodirkhanov, Ph.D. in Chemical Sciences
Number of students	15,088
Number of teaching professors	610
of them, academic degrees are held by	195 (15 D.Sc. + 180 Ph.D.)
Faculties	1. Mathematics and Physics 2. Natural Sciences 3. Philology 4. English Philology 5. Pedagogy 6. Primary Education and Physical Education 7. Vocational Education 8. Social Economy 9. The Center for Coordination of Joint Educational Programs

With the support of the KKhokimiyat of Namangan Region, together with Namanganbaliksanoat JSC and the foreign partner – the Belarusian Agricultural Academy, a scientific and educational center in the field of fisheries was created at the biotechnology.

In general, taking into account the socio-economic potential of the region, the University specialists carry out their research activities in the following priority areas:

1) Science and education, social sector;
2) Agriculture;
3) Chemical technology;

4) Food technology;
5) Pedagogy;
6) Economy and its branches.

Also, scientific schools of leading scientists have been formed at the university.

1) Scientific school “Organization and Management of the Educational Process” under the guidance of Prof. Sabitkhon Turgunov, D.Sc. in Pedagogy:
- Organization of the educational process;
- Management of the educational process;
- Organization and management of the pedagogical process.
2) Scientific school “History of Independent Uzbekistan” under the guidance of Prof. Tursunboy Fayzullaev, D.Sc. in Political Science:
- History of independent Uzbekistan;
- The role of Uzbekistan in the world community;
- History of the enlighteners of the region.
3) Scientific school “Isolation and Analysis of Active Substances from Plants” under the guidance of Prof. Shavkat Abdullaev, D.Sc. in Chemistry:
- Identification of new active substances from plants;
- Isolation of active substances from plants and physical and chemical analysis;
- Use of flavonoids in plants.
4) Scientific school in “Meteorology” under the guidance of Prof. Bahadir Kamolov, D.Sc. in Geography:
- Climatology;
- Agro-meteology;
- New mechanism of weather impact.
5) Namangan School of Onomastics under the guidance of Prof. Nasirjon Ulugov, D.Sc. in Philology:
- Toponymics (domestic names of places);
- Phytonymy (plant names);
- Oronymics (names of mountains, steppes).

The University has created scientific councils for the defense of dissertations in nine specialties. As of October this year, 20 researchers have successfully defended their dissertations. In total, 52 researchers are engaged in doctoral programmes in 27 specialties. According to the approved admission plan, in 2021 the number of doctoral students will be 71 people, of which 4 are targeted doctoral studies for training personnel for regional tertiary educational establishments.

In 2020, research activities carried out at Namangan State University resulted in:

- obtaining 10 documents of title for computer programs and 14 Certificates of Research Results Implementation;
- publishing 21 monographs, 762 academic papers, including 33 articles in journals indexed by the international Scopus database;
- publishing 290 papers in foreign scientific journals;
- publishing 442 papers in journals included in the list of the Higher Attestation Commission;
- publishing 486 papers in the proceedings of local conferences;

- publishing 250 papers in the proceedings of international conferences.

This year, the Higher Attestation Commission has recognized the Research Bulletin of Namangan State University as an international journal, and the Bulletin was included in the digital platform "Uzbekistan Research Online", being recognized as the most widely read scientific journal in Uzbekistan.

In the framework of the state research and technology programs in 2019, the University fulfilled two national grant projects totaling 391.0 million UZS. This year, three projects are being implemented, whose total amount of funding is 1,376 million UZS. Eighty professors, teachers and students participate in the projects, which is 1.8 times more than last year.

As part of the grant of the World Bank, the project *Organization of Training Workshops on Aquaculture (Fishing)* is being implemented, which is the only one in Central Asia, with the amount of financing of 200 thousand US Dollars. Two more projects for 1.4 billion UZS are being implemented as part of the European Union Erasmus+ program.

In 2021, the University is to launch production on 2 innovative startup projects: *Technology of Fruit Processing to Produce Candied Fruit* (800 million UZS) and *Exotic Fish Farming in the Local Conditions* (200 thousand US dollars).

In 2021, on the initiative of President of the Republic of Uzbekistan Sh.M. Mirziyoyev, the Innovation Faculty will be organized at the University, which will provide services to 12 higher educational establishments in the Fergana Valley in innovative activities and innovative education based on modern advanced educational technologies.

2. Namangan Institute of Engineering and Technology

The Namangan Institute of Engineering and Technology was created by converting the Namangan Institute of Engineering and Economy pursuant to Resolution No. PP-1533 of the President of the Republic of Uzbekistan *On Measures to Strengthen the Material and Technical Base of Higher Educational Institutions and Key Improvement of the Quality of Preparing Highly Qualified Specialists* dated May 29, 2011, and in order to strengthen the personnel resource base of textile and consumer goods industries on the basis of Resolution No.212 of the Cabinet of Ministers dated July 25, 2011. The Namangan Institute of Engineering and Economy was in turn created by Presidential Decree dated March 1992 on the basis of the Namangan branch of the Tashkent Institute of Textile and Light Industry. The University is part of the organizational structure of the Ministry of Higher and Secondary Specialized Education of the Republic of Uzbekistan.

Rector	Odiljon Okhundadaevich Mamatkarimov, D.Sc. in Physics and Mathematics
Vice-Rector for Research and Innovationss	Oybek Karimovich Ergashev, D.Sc. in Chemistry
Number of students	44,708

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Number of teaching professors	322
of them, academic degrees are held by	140 (24 D.Sc. + 116 Ph.D.)
Faculties	1. Consumer Goods Industry Technology 2. Engineering Technology 3. Automation and Power Engineering 4. Chemical Technology 5. Agricultural Technology

As of October of this year, the professors and teachers of the Institute have successfully defended dissertations: 4 DSc and 15 PhDs. Before the end of the year, another 33 researchers (8 DSc and 25 PhD) are to defend their dissertations. For 2021, a quota has been allocated for admission of two doctors of sciences in 2 specialties to doctoral studies, 39 basic doctoral students in 18 specialties for basic doctoral studies. In total, 52 researchers in 27 specialties study at the Institute under doctoral programs. According to the approved admission plan, in 2021 the number of doctoral students will be 71 people, of which 4 are target doctoral studies for training personnel for regional universities.

In 2020, research activities carried out at the Namangan Institute of Engineering and Technology resulted in:

- obtaining 5 patents of invention, 23 authorship certificates for computer software, filing 20 applications for documents of title;
- publishing 25 monographs, 6 textbooks and 21 teaching aids;
- publishing 211 papers in foreign scientific journals;
- publishing 300 papers in journals included in the list of the Higher Attestation Commission.

Currently, within the framework of the project competition announced by the Ministry of Innovative Development of the Republic of Uzbekistan, researchers of the Institute are carrying out research activities on 7 projects for the amount of 2 billion UZS. By the end of the year, it is planned to complete 5 more projects.

Under the UniCEN program funded by the US Embassy in Tashkent, researchers of the Institute are implementing the Project *Developing Long-Term Research and International Cooperation between the University of Tennessee-Knoxville (Knoxville, Tennessee) and Namangan Institute of Engineering and Technology (NIET)*.

Under the EU Erasmus+ program, researchers of the Institute have been implementing a three-year project amounting 999.5 thousand EURO, aimed at developing the entrepreneurial skills of students. The main partner is the European University TECHNICKA UNIVERZITA V KOSICIACH (Slovakia).

In addition, more than 20 fundamental, practical and innovative projects have been submitted for competitions in various fields announced the Ministry of Innovative Development of the Republic of Uzbekistan. Currently, technical expertise is being conducted on the projects.

3. Namangan Civil Engineering Institute

The Namangan Institute of Industry and Technology was created on the basis of the Namangan branch of Tashkent Institute of Mechanical Engineering by Resolution No. 75 of the Cabinet of Ministers at the President of the Republic of Uzbekistan dated March 29, 1991. In accordance with Resolution No. 77 of the Cabinet of Ministers *On the Organization and Management of Academic Lyceums and Professional Colleges* dated February 24, 1998, the Namangan Institute of Industry and Technology was renamed as the Namangan Institute of Engineering and Pedagogy. In accordance with the Decree of the President of the Republic of Uzbekistan *On Measures for Further Development of the Higher Education System* dated April 20, 2017, the Namangan Institute of Engineering and Pedagogy was reorganized into Namangan Civil Engineering Institute.

Rector	Sharibboy Tulanovich Ergashev, D.Sc. in Engineering
Vice-Rector for Research and Innovationss	Sa'dillakhon Ismatullaevich Umarkhanov
Number of students	44 708
Number of teaching professors	290
of them, academic degrees are held by	114 (17 D.Sc. + 97 Ph.D.)
Faculties	1. Engineering and Technology 2. Construction 3. Utilities Systems 4. Transport 5. Mechanical Engineering 6. Informatization of Power Generation Sector and Industry

In accordance with Resolution No. 272 of the Chairperson of the Higher Attestation Commission under the Cabinet of Ministers of the Republic of Uzbekistan dated September 30, 2019, the Academic Council No. PhD.03 / 30.09.2019.T.90.01 with the assignment of an academic degree in the specialties "Mechanization of Agricultural Activities and Reclamation (Engineering), 05.02.02-Theory of Mechanisms and Machines, Mechanical Engineering and Machine Parts (Engineering), and 05.07.01-Agricultural and Land-Reclamation Machines was transferred to the Institute.

In 2020, 9 PhD dissertations were defended in the Academic Council, 4 of which are accounted for professors and teachers of the Institute. In 2018, academic degrees were awarded to 10 professors and teachers, including 2 doctors of science (DSc) and 8 doctors of philosophy (PhD). In 2019, academic degrees were awarded to 7 professors and teachers, including 3 doctors of science (DSc) and 4 doctors of philosophy (PhD). In 2020, the degrees of D.Sc. in Philosophy (PhD) have been awarded to 14 professors and teachers, and the degree of D.Sc. in Science (DSc) has been awarded to 1 researcher.

In general, the Institute carries out its research activities in the following areas:

1) improving the calculation of building structures, studying the seismic resistance of buildings and structures, saving material and energy resources in the production of building materials and

products, using economical modern technologies to increase the economic efficiency of the production of wall and decorative materials;

2) organizing the manufacture of energy-saving and resource-saving construction materials to achieve economic efficiency in the construction and manufacture of building materials using the obtained results in the manufacturing processes; studying the structural and seismic safety of buildings reconstructed from reinforced concrete structures and technologies of reinforced concrete products and structures;
3) researching the issues of improving the activities of road transport and road facilities enterprises;
4) improving the scientific and technical basis of the chemical and food industries, as well as activities for the mechanization of agriculture;
5) creating intelligent computer systems for processing, control and protection of information, development of effective methods of using modern information technologies in the educational process and expanding the possibilities of using multimedia technologies;
6) developing research methods for materials necessary for the electronic industry and power industry, studying natural and technological processes by physical methods and their control, developing fundamental physics and electronics;
7) implementation of corporate cooperation with research, education establishments and production enterprises;
8) fostering research and innovation activities, creating effective mechanisms for the introduction of research and innovative achievements into practice, creating specialized research laboratories in the departments, and introducing advances in science and technology in teaching disciplines.

Within the above areas, the Institute has concluded business agreements with 23 enterprises and organizations of the region. In addition, a bank of more than 100 thematic problems of the largest industrial enterprises of the region was created in the Institute. A number of activities have been carried out at NamCEI to integrate education and production and science. The list of research Institutes and industrial enterprises of the region given below is formed at the Institute on the basis of innovative cooperation.

In 2018-2020, research activities carried out at Namangan Civil Engineering Institute resulted in:

- obtaining 17 patents for inventions, 44 authorship certificates for computer programs, filing 20 applications for documents of title;
- publishing 39 monographs;
- publishing 549 papers in foreign scientific journals, including 62 papers in journals indexed by the international Scopus database;
- publishing 414 papers in journals included in the list of the Higher Attestation Commission;
- publishing 1200 papers in the proceedings of conferences.

This year, the Institute has completed 3 state grant projects to the amount of 384 million UZS, economic contracts to the amount of 49.1 million UZS, as well as work to the amount of 276.783 million UZS on training courses:

- 2 fundamental projects:

OT-F2-70 - *Influence of Temperature, Deformation and Light on the Parameters of Nano-Scale Semiconductors in a Strong Electromagnetic Field*;

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OT-F2-71 – *Studying the Effect of Light on the Current-Voltage Curve of a Deformed p-n-Junction in an Electromagnetic Field of Very High Frequency*.

- 1 practical project:

MV-Atex-2018-158 - research work is carried out within the framework of the state grant program of a practical project on the theme: *Designing Small-Sized Potato Raisers for Farming Enterprises and Dekhkan Farms.*

27 thematic projects have been submitted to the competition for innovative projects of state programs of research activity for 2020.

Also, this year, 2 projects of the Institute have been submitted to the Ministry for the international Uzbek-Turkish and Uzbek-Chinese competition of joint scientific projects, and the selection process is continuing.

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Administrative center	Andijan
Administrative divisions	14 districts
KKhokim	Shukhratbek Kushakbaevich Abdurakhmanov
Area	4 240 km² (ranked 13th)
Population	3 153 400 people (ranked 4th)
Largest cities	Andijan, Asaka, Shakhrikhan
GRP output	32 897. 2 billion UZS (ranked 6th)
GRP structure	Agriculture, forestry and fisheries – 45% Industry – 22.6% Construction – 6% Trade and services sector– 26.8%
Key Indicators of the Development of the Scientific & Technological Potential and Innovations in Andijan Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary education institutions	5
Number of institutions with a postgraduate education system	5
Number of doctoral/postdoctoral students	156
PhD/Ds applicants graduated	21/8
Number of institutions engaged in R&D	5
Size of R&D financing	3 429.4 million UZS
Number of employees engaged in R&D	221
Number of implemented technological innovations	90
Number of new technologies acquired by institutions	37

Background

Andijan region was formed on March 6, 1941 by the decree of the Presidium of the Supreme Soviet of the USSR within the Uzbek SSR by separation from Fergana Region. Earlier, in 1926-1930, the Andijan district of the Uzbek SSR existed on this territory. In 2003, the Order of Amir Timur was awarded to the region.

It is believed that Andijan in the 9th century, after the collapse of the Arab Caliphate, became part of the Samanid state and turned into one of the main centers of the Fergana Valley. In the 14th century, it became part of the Timurid state, when science, art and architecture developed. At the beginning of the 16th century, it was included in the Sheibanid state (under the name Andigan it is referred to as the capital of the state). In the 17th-19th centuries, Andijan was part of the Kokand Khanate.

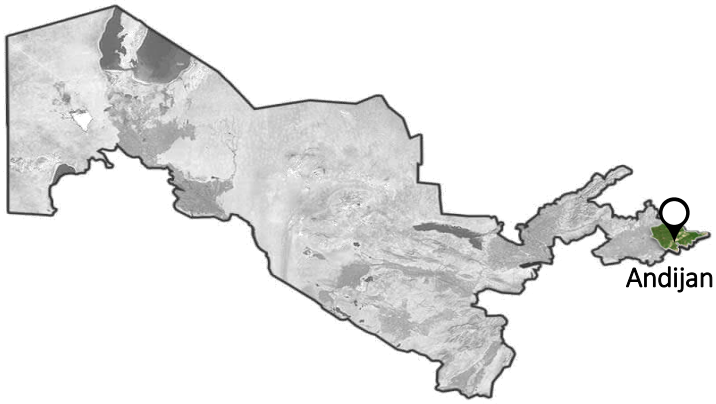
Andijan is famous for the fact that the celebrated Zakhiriddin Babur (1483) – a descendant of Amir Temur, poet, ruler and founder of the Mughal Empire in India – was born there. Babur made his mark on the political and literary life of Maverannahr in the 15th-16th centuries. Along with huge state affairs, Babur left

a very valuable literary heritage. The main work of his life is his autobiography and the encyclopedia named *Babur-Name*, which describes human life, nature, traditions and customs of people of that era.

Region's Economy

Transport corridors to Kyrgyzstan run through Andijan Region: railway lines have been laid to Jalal-Abad/Osh (Kyrgyzstan) and Tash-Kumyr (Kyrgyzstan), which make the center of the region a major transport hub in Central Asia. In addition, railway lines connect Andijan with cities such as Margilan, Namangan, Pap and Angren, connecting the Fergana Valley with Tashkent Region. There are scheduled flights to cities of Uzbekistan, the CIS, and foreign countries (depending on commercial demand).

Natural resources include deposits of oil, natural gas, ozokerite and limestone. The Andijan, Palvantash, South Alamysh, Khartum, Bustan and Khojausman oil and gas fields are located here.



The warm climate allows growing cotton, subtropical crops, and developing silkworm breeding and melon growing. In agriculture, the most developed are cotton-growing, cocoon production, growing grain varieties, horticulture and viticulture.

The total land area is 26.1 thousand hectares. Of these, the irrigated agricultural area is 23.4 thousand hectares, the non-irrigated agricultural area is 3.1 thousand hectares, the area of pastures for animal husbandry is 3 thousand hectares.

As to industry, mining and processing of minerals, oil and gas, the construction industry, and the textile industry are developed. Andijan Region has many well-known oil fields. Now, there are 8 large and 2 small mines.

The first automobile plant in Central Asia was opened in the city of Asaka. In 1992, UzDaewoo was created on a parity basis by the state-owned company Uzavtosanoat and Daewoo for the assembly of passenger cars.

In 2002, GM acquired a majority stake in Daewoo Motor Automotive Corporation. In 2005, UzDaewoo bought out a stake in a bankrupt Korean company.

In May 2007, the Uzbek government signed a strategic cooperation agreement with GM DAT, which provides for the modernization of Nexia and Matiz, further localization of production, and even the possibility of producing new models at UzDaewoo. In March 2008, a new joint venture General Motors Uzbekistan was created.

Development of Scientific and Innovative Activities in the Region

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Research and innovation activities in the region are carried out by five higher educational institutions and one research Institute.

1. Andijan State University

Andijan State University was founded in 1992 by the Decree of the President of the Republic of Uzbekistan dated February 28, 1992 on the basis of Andijan State Pedagogical Institute and is part of the organizational structure of the Ministry of Higher and Secondary Specialized Education of the Republic of Uzbekistan.

Today, the university has 11 faculties and 37 departments. Doctoral studies are open in 32 specialties.

Rector	Prof. Akramjon Sultanmuradovich Yuldashev, D.Sc. in Biological Science
Vice-Rector for Research and Innovationss	Bakhtiyor Makhmudjonovich Rasulov, D.Sc. in History
Number of students	Over 10,260
Number of teaching professors	802
of them, academic degrees are held by	192 (33 D.Sc. + 159 Ph.D.)
Faculties	1. Philology 2. Mathematics and Physics 3. Social and Economic 4. History 5. Pedagogy 6. Foreign Languages 7. Natural Sciences 8. Physical Education 9. Preschool Education 10. Art History 11. Information Technology and Computer Engineering

More than 10,100 intramural and extramural students in 29 bachelor's degree programs study at the University, so do more than 160 students in 18 master's degree specialties, 93 doctoral students, 5 intern researchers, and 25 independent researchers.

By the decision of the Higher Attestation Commission under the Cabinet of Ministers of the Republic of Uzbekistan dated February 28, 2018 and February 1, 2019, a Scientific Council was established at the University, which awards academic degrees in two specialties in the field of semiconductor physics and historical sciences. In addition, research is carried out by basic doctoral students and independent researchers in 12 specialties.

Nine months into 2020, 19 researchers successfully defended their doctoral dissertations, including 16 doctors of philosophy (PhD) and 3 doctors of science (DSc). By the end of the year, 8 more Doctors of Philosophy (PhD) and 2 Doctors of Science (DSc) are expected to defend their doctoral dissertations. As a

result, in the 2020-2021 academic year, the scientific potential of professors and teachers is expected to increase by 35%.

For 2021, a quota of 51 doctoral students (DSc) and basic doctoral students (PhD) has been allocated to the University from the state budget, of which 2 are the quota of target basic doctoral studies.

In the 2020-2021 academic year, it is planned to train 7 doctoral students in 17 specialties, 56 basic doctoral students and 70 independent researchers.

Out of 454 university lecturers, who do not have a degree, 180 had R&D projects registered with the Higher Attestation Commission.

In the period 2019-2020, 152.0 million UZS were transferred to the account of the branch due to the introduction of the results of scientific research obtained by professors and teachers of departments and the provision of consulting services.

As of September 2020, due to the introduction of the results of scientific research into production, 51.0 million UZS were transferred to the account of the branch.

By the end of the year, as a result of the introduction of the results of scientific research into production, an additional income of 150 million UZS is expected.

In general, the University carries out research activities in the following areas:

1. Literary Theory;
2. Semiconductor Physics;
3. Botany;
4. Uzbek Language. Uzbek Literature;
5. History of Uzbekistan;
6. Language Theory. Applied and Computational Linguistics;
7. Classification and Certification of Goods by Chemical Composition;
8. Languages and Literature of the Peoples of Europe, America and Australia;
9. Theory and Methods of Teaching;
10. Management;
11. Comparative Literature, Comparative Linguistics and Translation Studies;
12. Theory and History of Pedagogy;
13. Management in Education.

Within these areas, over the past three years, Andijan State University has implemented 15 grant projects for the amount of 756.6 million UZS under 14 state research and technology programs, of which 5 programs are fundamental, 8 ones are applied, one program is innovative, and one program is applied research of young scientists.

In 2019, 481 academic papers and 12 monographs were published in foreign academic periodicals, including 217 papers in foreign journals and 264 ones at foreign conferences. In total, 489 papers were published at the national level, including 192 ones in republican local journals and 297 ones at national conferences.

As of September 1, 2020, 1,040 academic papers were published, including 254 ones in foreign journals and 287 ones foreign conferences, 135 papers in local journals and 364 ones at national conferences.

By December 2020, it is planned to publish 615 academic papers in foreign periodicals, and 506 academic papers and 10 monographs at the national level.

In 2020, the electronic journal *Life Science and Agriculture* has been created for the publication of scientific articles by professors, doctoral students, independent researchers, and masters.

To improve the rating indicators of the University, professors and teachers have submitted more than 100 academic papers to be published in journals included in the "Web of Science", "Scopus", "Google Scholar" databases.

By September 2020, professors of the University had obtained 8 authorship certificates for utility models (programming information systems).

In December 2020, it is planned to obtain 5 additional authorship certificates and 3 patents.

Professors of the University are implementing several state development projects:

1. Fundamental project No. OT-F1-18 on the topic: *Development of Methods and Methodology for the Formation of Mass Language Culture*, scheduled for the years 2017 to 2020 (research advisor - prof. Sh. Shakhobiddinova).

2. Fundamental project No. OT-F2-68 on the topic: *Mechanisms of the Formation of Micro- and Nanoparticles Such as Input Defects in Crystals and Their Role in the Creation of Multifunctional Structures with a Wide Range of Functions*, scheduled for the years 2017 to 2020 (research advisor – S.V. Zainobitdinov).

3. Practical project No. VA-FA-F2-006 on the topic: *Compilation of an Astrometric and Photometric Catalog of Stars Based on Astronomical Negatives*, scheduled for the years 2017 to 2020 (research advisor - M. Muminov).

4. Practical project No. PZ-2017092686 on the topic: *Study of Uzbek Forensic Linguistics*, scheduled for the years 2018 to 2020 (research advisor - prof. Sh. Shakhobiddinova).

5. Fundamental project No. FZ-22020001064 on the topic: *Creation of Modern Didactic Methodological Support of Preschool Education (PEE) on the Basis of Higher Educational Institutions*, scheduled for the years 2017 to 2020 (research advisor – V.V. Kadyrov).

In 2020, the Ministry of Innovative Development of the Republic of Uzbekistan received 12 initiative research projects for the years 2020 to 2024, prepared based on topical issues aimed at the socio-economic development of Andijan Region:

1. Classification of Non-Associative Algebras, Their Differentials and Characteristics of Automorphisms (the amount of funding is 300 million UZS);
2. Creation of Scientific Foundations for Growing Natural Medicinal and Promising Introduction Plants in the Fergana Valley (the amount of funding is 1 billion UZS);
3. Creation of a Primary Source for Breeding Based on Determining the Phylogenetic Relationship of Diploid Cotton Species with Different Genomes (A, S, 0) (the amount of funding is 500 million UZS);
4. Creation of New Biologically Active Compounds Based on Plant Raw Materials (the amount of funding is 250 million UZS);

5. Obtaining New Products from Industrial Waste at “Biochemistry” JSC (the amount of funding is 250 million UZS);
6. Creation of Effective Methods and Means of Protection against Pests of Fruit and Ornamental Trees in the Fergana Valley (the amount of funding is 500 million UZS);
7. Improving the Effectiveness of Methods of Biological Control over Rodents of Corn and Other Grain Fodder Crops (the amount of funding is 700 million UZS);
8. Certification by DNA Method of Barcoding of Coccids and Aphids of the Fergana Valley (the amount of funding is 900 million UZS);
9. Application of Processes of Biochemical Analysis on Agricultural Land and Study of its Impact on the Agricultural Yield (the amount of funding is 1 billion UZS);
10. Development of Tourism in Andijan Region (the amount of funding is 200 million UZS);
11. Study of the Physicochemical Properties and Structure of Condensed States in Silicon and Gallium Arsenide, the Input Atoms of Which are Used to Create Multifunctional Electronic Products that Form Micro- and Nanoclusters (the amount of funding is 900 million UZS).

Andijan State University has established contacts with 26 foreign partners, with 9 of which contracts have been signed. The contracts are intended for 6 departments.

In order to create ample opportunities for teaching professors and gifted youth to quickly publish the results of research conducted at the University in the “*ADU Ilmiy Khabarnomasi”* journal (Scientific Bulletin of ASU), such fields as philology, history of pedagogy and psychology, philosophy, philology, pedagogy, chemistry, physics, and biology have been added to the list of the Higher Attestation Commission of the Republic of Uzbekistan.

2. Andijan Machine-Building Institute

Andijan Machine-Building Institute is a full member of the Association of Technical Universities of the CIS, has signed international agreements and memorandums of understanding with 38 higher educational establishments.

In 2020, agreements have been signed and are planned to be signed with such universities of the Russian Federation as South Ural State University, South Ural State Pedagogical University, Novosibirsk State Technical University, Peter the Great St. Petersburg Polytechnic University, St. Petersburg Electrotechnical University, Rostov State Economic University, as well as the Gomel State Technical University named after P.O. Sukhov, Belarusian-Russian University, Angel Kynchev University of Ruse in Bulgaria, Greek University of Western Attica (UniWA), Rzeszow University of Technology in Poland, the University of Zilina in Slovakia, Handong Global University of South Korea and the University of Alpen Adria (Austria).

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Rector	Umid Mukhtaralievich Turdialiev, D.Sc. in Engineering
Vice-Rector for Research and Innovationss	Ulugbek Abdukhalilovich Madrakhimov, D.Sc. in Economics
Number of students	4,655
Number of teaching professors	303
of them, academic degrees are held by	79 (9 professors, D.Sc. + 70 (associate prof., Ph.D.)
Faculties /specialties	1. Automotive Engineering 2. Mechanical Engineering Technology 3. Automation and Electrical Engineering 4. Organization of Transportation and Transport Logistics 5. International Faculty

In December 2018, a new project "*Intelligent Transport Systems: Master's Program for Uzbekistan Based on New Information and Communication Technologies*" (INTRAS) was launched. Rector of the Institute Umid Turdialiyev, Head of the Department of Materials Science and Technology of New Materials Begijon Tajibaev, Associate Professor of the Department of Materials Science and Technology of New Materials Lutfiddin Olimov and senior lecturer of the Department of Physics and Chemistry Sukhrobjon Aliev took part in the third reporting meeting on the Project, which was held from October 19 to November 4 at the University of Alpen-Adria (Austria). In addition, a fourth-year student majoring in *Automobile and Tractor Manufacture* Jahongir Abdusattarov and a third-year student majoring in *Material Science and New Materials Technology* Faizullo Abdulkhamidov took part in a training workshop in the framework of the project, which took place from October 19 to November 4. Project number: No. 586292-EPP-1-2017-1-PL-EPPKA2-CBHE-JP.

Cooperation with the National Erasmus + Office (NEO) of the European Union continues. In particular, in December 2019, a new project *Modernization of the Higher Education System in Central Asia Using New Technologies* (HiEdTec) was launched. Within the framework of the project, the Dean of the Innovative Educational Technologies Javlonbek Rakhmatillaev and the Head of the International Relations Department Zafar Juraev took part in the opening of the project from March 11 to 16 at the Angel Kynchev University of Ruse in Bulgaria. Project number: No. 598092-EPP-1-2018-1-BG-EPPKA2-CBHE-SP.

Also, in December 2018, a new project *Intelligent Transport Systems: Master's Program for Uzbekistan Based on New Information and Communication Technologies* (INTRAS) was launched. In the second reporting meeting on the project held on April 1-4 at the University of Žilina in Slovakia, Associate Professor of the Department of Material Science and Technology of New Materials Lutfiddin Olimov, Assistant Professor of the Automobile Manufacture Department Ilkhom Nasyrov, senior lecturer of the Department of Technological Machines and Equipment Muhammadilo Alibaen took part. In addition, on April 1-15, a third-year student majoring in *Automobile and Tractor Manufacture* Jakhongir Abdusattarov and a third-year student majoring in *Technological Processes and Production Automation* Begzod Mamajonov took part in the training seminar. Project: No. 586292-EPP-1-2017-1-PL-EPPKA2-CBHE-JP.

Head of the Department of International Relations Zafar Juraev, Head of the Department of Automation of Machine Manufacturing Yakubjon Kubonov and senior lecturer of the Surface Transport Systems Department Sarvar Yusupov attended the second reporting meeting on the project *Modernization of the*

System of Higher Education in Central Asia through New Technologies (HiEdTec), which took place on July 1 to 6, 2019 at the Almaty Technological University. Project: No. 598092-EPP-1-2018-1-BG-EPPKA2-CBHE-SP.

Among the projects submitted by the Institute for the announced competition of the Erasmus+ program for the development of higher education in 2019, project documents "M*echatronics: Modernization of Curricula Based on Continuous Education in Uzbekistan*" (MECHAUz) were submitted in February this year . It has been recommended for funding by the European Union. Currently, preparations are underway for the implementation of this project. Number of the application for the project: 609564-EPP-1-2019-1-EL-EPPKA2-CBHE-JP.

3. Andijan State Medical Institute

Andijan State Medical Institute was established in 1955. Today, the Institute trains students in such areas as curative medicine, pediatrics, dentistry. In addition, the Institute is engaged in advanced training and retraining of doctors and healthcare specialists, and also prepares personnel in 29 specialties of Master's Degree Program. In accordance with Resolution PP-2909 of the President of the Republic of Uzbekistan dated April 20, 2017, in the 2019-2020 academic year, 2 new areas of Master's degree study were organized: 5A 510102 - Endocrinology and 5A 510126 - Pharmacology.

Rector	Prof. Madamin Muminovich Madazimov, D.Sc. in Medicine
Vice-Rector for Research and Innovationss	Prof. Gulomiddin Minkhodjievich Khodjmatov, D.Sc. in Medicine
Number of students	4,414
Number of teaching professors	621
of them, academic degrees are held by	10 (39 D.Sc. + 153 Ph.D.)
Faculties	1. Curative Medicine 2. Pediatrics 3. Dentistry 4. Advanced training and retraining of doctors

Currently, 3903 students study at the Institute in 7 educational areas of bachelor's degree, 391 students study in 29 specialties of Master's Degree Program, 20 students are engaged in joint programs, 100 students are engaged in foreign studies. Today, 39 foreign citizens study at the Institute.

In accordance with Resolution No. 273/2 of the Presidium of the Higher Attestation Commission of the Republic of Uzbekistan dated December 30, 2019 and Resolution No. 286 of the Chairperson of the Higher Attestation Commission dated December 30, 2019, the Scientific Council of 19 people was created at the Andijan State Medical Institute and the code of the council PhD. 04/30.12.2019. Tib. 95.01 was established.

Nine months into 2020, 3 doctors of philosophy (PhD) and 4 doctors of science (DSc) successfully defended their dissertations.

In order to ensure the implementation of the tasks set by Resolution No. 304 of the Cabinet of Ministers of the Republic of Uzbekistan *On Measures to Further Improve the System of Postgraduate Education* dated May 22, 2017, in 2020, 24 applicants study in basic doctoral studies (in the first academic year - 8 people, in the second academic year - 7 people, in the third academic year - 9 people).

The professors and teachers of the Institute are implementing one fundamental and one practical project, which won the competition of the Ministry of Innovative Development.

From March 2019 to August 2020, within the framework of an interdepartmental project (Andijan State Medical Institute, Andijan Institute of Mechanical Engineering, South Korean TEGU University), an international project *Joint Master's Program in Clinical Engineering in Uzbekistan* was implemented, which won a grant from the Academic Innovation Fund in the amount of USD70,000.

In 2020, as part of the ongoing research activities, academic papers were prepared and published:

- 34 papers are published in foreign scientific journals included in the Scopus and Web of Science databases;
- 151 ones are published in other foreign scientific journals;
- 106 papers are published in republican scientific journals;
- 19 monographs;
- 295 efficiency proposals;
- 20 patents were obtained.

4. Andijan Sharda University

Andijan Sharda University was founded in 2019 in accordance with Resolution No. PP-4278 of the President of the Republic of Uzbekistan *On the Establishment of Sharda University in Uzbekistan* dated April 10, 2019. In the same year, in September, the first enrollment of students to Sharda University of Sharda. Currently, the University has faculties in the areas of management, engineering and technology, humanities and fundamental sciences. At the university, students are taught according to BBA, B.Tech, BA programs and a practical English program.

Rector	Dr. Anviti Gupta, Prof.
Vice-Rector for Research and Innovationss	Prof. Alok Gupta
Number of students	403
Number of teaching professors	16
of them, academic degrees are held by	7 (3 D.Sc. + 4 Ph.D.)
Faculties	1. Business Management 2. Technology 3. Humanities (Applied English)

The University carries out research activities in the following areas:

1. Smart farming. Research and development is underway to monitor Wi-Fi-based agricultural sensors (temperature, methane, humidity and humidity) using Android app, Wi-Fi-based agricultural sensor monitoring system, IoT system for agriculture, Arduino Garden controller - automatic irrigation and data logging.
2. Robotics. A project is currently underway to develop an Arduino-based agricultural robot using Bluetooth. This development is an intelligent irrigation monitoring system based on the Internet: it has control, an ultrasonic sensor for detecting obstacles in the path of movement, a soil moisture sensor for detecting dry and wet conditions on agricultural lands.
3. Automatic protection of the farm from wild animals with notification by PIC and GSM. The project *Intelligent System for Protection of the farm from animals PIC* offers an automatic system for the protection of plants from animals, insects and pests. This system uses a sensor that detects the movement of animals and insects approaching the field.
4. Artificial intelligence. The project *Smart Irrigation System with the Arduino* is designed for a large-scale irrigation area with water scarcity. The project is aimed at large-scale irrigation with maximum water saving and cost reduction. In addition, the project will make it possible to apply fertilizers and control their volume, combining with the so-called ferti-irrigation with a combination of water and fertilizers.

Also, Sharda University is cooperating in the industrial sector with JSC UzAutoMotors.

5. Andijan branch of Tashkent State Agrarian University

The Andijan branch of the Tashkent State Agrarian University was founded in 1964.

Currently, the university has over 4,818 students, 122 master's students and 18 doctoral students.

Director	Associate Prof. Komiljon Sobirovich Komilov, Ph.D. in Agriculture
Deputy Director for Research and Innovations	Associate Prof. Ulugbek Ballasov, Ph.D. in Agriculture
Number of students	4,818
Number of teaching professors	311
of them, academic degrees are held by	131 (16 D.Sc. + 115 Ph.D.)
Faculties / specialties	1. Agrotechnology 2. Plant Protection, Agrochemistry and Agriculture 3. Storage and Processing of Agricultural Products 4. Agribusiness and the Digital Economy 5. Agroengineering and Hydromelioration

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The University teaches students in 15 specialties:

1. Agronomy;
2. Accounting and audit;
3. Water management and land reclamation;
4. Plant protection and quarantine;
5. Management in agriculture;
6. Mechanization of agriculture;
7. Fruit and vegetable growing and viticulture;
8. Professional education (agronomy);
9. Selection and seed production of agricultural crops;
10. Professional education (information technology);
11. Professional education (agricultural mechanization);
12. Economy (by branches and sectors);
13. Professional education (economics);
14. Operation of hydraulic structures and pumping stations;
15. Technology of storage and primary processing of agricultural products.

As of September 2020, 11 people have successfully defended their doctoral dissertations, including 9 doctors of philosophy (PhD) and 2 doctors of science (DSc). By the end of the year, 6 more Doctors of Philosophy (PhD) and 2 Doctors of Science (DSc) are expected to defend their doctoral dissertations. As a result, in the 2020-2021 academic year, it is expected that the scientific potential of professors and teachers will increase by 45%.

In the 2019-2020 academic year, 18 doctoral students (D.Sc. in Philosophy - PhD) and 49 independent researchers in 10 specialties were trained.

In the 2020-2021 academic year, it is planned to train 7 doctoral students in 17 specialties, 56 basic doctoral students and 70 independent researchers.

In the period 2019-2020, 152.0 million UZS were transferred to the account of the branch due to the introduction of the results of scientific research into production and the provision of consulting services.

As of September 2020, due to the introduction of the results of scientific research into production, 51.0 million UZS were transferred to the account of the branch.

Before the end of the year, due to the introduction of the results of scientific research into production, an additional income of 150 million UZS is expected to be received on the account of the branch.

As part of research activities, in 2019-2020, professors and teachers published 1 252 academic papers:

- 383 papers in other foreign scientific journals;
- 304 papers in republican scientific journals;
- 284 abstracts in collections and proceedings of international conferences;
- 262 abstracts in collections and proceedings of national conferences;
- 19 monographs.

In 2020, an electronic journal Life Science and Agriculture has been created in the branch for the publication of academic papers by professors, doctoral students, independent researchers, and masters.

Professors and teachers have submitted more than 60 academic papers for publication in journals included in the Web of Science, Scopus, Google Scholar databases.

In 2020, the academic teaching staff of the branch have obtained 3 authorship certificates for utility models (programming information systems). It is planned to obtain 3 more authorship certificates and 2 patents.

The branch is gradually implementing the concept “University 3.1 “, which provides an inextricable link between activities in the field of education, science, innovation and the commercialization of research results.

In the Information and Consultation Center (the Extension center) of the branch 5 mobile groups have been organized.

In 2020, 4.5 hectares of land are used for fish farming using intensive technology, and within the framework of international projects of the European Union GIZ, a modern livestock complex for 60 head of cattle was built on 2 hectares of land, 30 heads of cattle were imported from Austria.

In 2020-2021, it is planned to launch the production of fish and fish products, the production and processing of milk.

In 2020-2021, it is planned to create the “Elite Rice Growing Seeds” Center and the “Soil Science” research laboratory.

Within the framework of the project *The Chain of Value Added in Agriculture*, implemented in partnership with USAID Fund, in total, 6,5 ha of intensive orchards will be stringed with wire.

In 2019, on the basis of an innovative project on the topic: QX-A-QX-2018-113 *Selection, improvement of seed production and introduction into production of promising pumpkin varieties in the climatic conditions of Andijan Region*, research activities were carried out to the amount of 200.0 million UZS.

In 2020, an applied project is being carried out on the topic: *Evaluation of rust-resistant, high-yielding, grain properties of hybrid populations of winter soft wheat, which have become a constant element of the selection process, the creation of new varieties through selection and the creation of a system of primary seeds* for the amount of 450.0 million UZS.

In 2020, the Ministry of Innovative Development of the Republic of Uzbekistan received 36 initiative research projects on topical issues aimed at the socio-economic development of Andijan Region.

Of the submitted projects, 2 innovative projects with a financial volume of 3.9 billion UZS, scheduled for for 2020-2022, including the projects *Growing an asparagus plant in the Fergana Valley and the creation of new drugs based on the definition of medicinal criteria* with a financial volume of 1, 5 billion UZS and *Organization of introduction, selection and primary seed production of non-traditional and export vegetable crops* with a financial volume of 2.4 billion UZS are published on the website of the Ministry and are being considered for funding by the Technical Expert Councils.

In the period 2020-2021, 3 Start-Up projects with a total financial volume of 5.5 billion UZS have been submitted to the competition announced by the Ministry of Innovative Development of the Republic of

Uzbekistan, including on the topic: *Organization of phyto bars and cultivation of medicinal plants within small innovative enterprise Fito-galen, creation of a processing cluster* with a financial volume of 1.0 billion UZS,and on the topic: *Creation of cluster technologies for the production of a wide range of food products from fruits with seeds* with a financial volume of 3.5 billion UZS, and on the topic: *Creation of a training and production center for growing organic vegetables in a greenhouse based on modern technologies and organization of growing products* "with a financial volume of 1.0 billion UZS are being considered for funding by technical experts.

The Ministry of Innovative Development of the Republic of Uzbekistan and the Federal Ministry of Education and Research of Germany (BMBF), together with the University of Applied Sciences in Leipzig (Germany), are participating in an international competition for research projects in the field of information automation in agricultural production and processing.

On the initiative of the Consulate General of the Republic of Uzbekistan in Istanbul, cooperation has been established with Turkish universities and foundations.

On the initiative of the Embassy of the Republic of Uzbekistan in London, international scientific cooperation was established with the Cardiff University of Great Britain and with the aim of further increasing the scientific potential of the Institute, improving the research skills of professors and teachers in accordance with international standards, as well as joint research projects, a bilateral agreement was reached.

Mutual agreements have been reached on the preparation of joint research projects with the University of Cardiff in the area of *Knowledge Frontiers: International Interdisciplinary Research* of the British Academy of Sciences, their submission for funding, as well as on the preparation of joint projects for the grant competitions of the British Academy of Sciences "Visiting scholar", "The Humanities and Social Sciences Tackling the UK's International Challenges", "Writing Workshops", "Education and learning in crisis", "Global professorship".

Cooperation continues on the preparation of joint projects for the competitions of the FAO organization on food safety and the improvement of food standards, the organization and management of scientific and technical assistance to farms supplying raw materials for the pharmaceutical industry, the study of prospects for the development of production in horticulture, melon growing and livestock farming, the development of its model and forecast.

It is planned to prepare joint research projects for the development and implementation of innovative agricultural technologies in agriculture for the European Union's Horizon 2020 grant competition.

Many talented young people have now had the opportunity to study in the UK, mutual agreements have been reached to study from the 2021-2022 academic year under the 2+2 scheme of the following joint undergraduate programs in accounting and finance (BSc), business economics and 1+1 of the following joint master's programs in accounting and finance (BSc), business economics.

6. Research Institute of Grains and Legumes (NIIZZK)

The Research Institute of Grains and Legumes was founded in 1997. In accordance with Decree No. PP-2125 of the President of the Republic of Uzbekistan *On Improving the Activities of the Uzbek Scientific and Production Center of Agriculture* dated February 10, 2014, it was reorganized.

Director	Abdulaziz Abdulazizovich Abdivasikov
Number of structural divisions	13
Number of employees	77
Number of researchers	35
of them, academic degrees are held by	5 (1 D.Sc. + 4 Ph.D.)

The main activities of the Institute are:

- creation of new varieties of agricultural crops, deep scientific research of their hybrids and lines;
- creation of high-yielding and high-quality varieties of grain and leguminous crops, oilseeds and non-traditional crops adapted to local conditions, improvement of intensive cultivation technology, production of primary seeds, provision of seed-production farms with high-quality seeds on a contractual basis and cooperation with them;
- introduction of advanced scientific innovations (exhibition seminars, trainings, lectures) and the publication of research results in the agro-industrial complex aimed at planting, care and high yields of grain and leguminous and non-traditional crops in clusters, farms and household plots.

Currently, 9 doctoral students are studying at the Institute, of which DSc - 2, PhD - 7.

Scientific experimental stations operate as part of the research Institute: the Kashkadarya branch and 12 scientific experimental stations in the regions.

The Institute has at its disposal agricultural land with a total area of 175.6 hectares, of which grain lands for crop rotation - 120.3 hectares, legumes - 47.3 hectares, oilseeds and non-traditional crops - 8 hectares. In addition, the area of land in the branches and research and experimental stations of the Institute is 2546 hectares, of which 1547 hectares are irrigated, 999 hectares are arid.

The Institute has developed 14 high-yielding, disease-resistant and pest-resistant varieties of winter wheat. Besides that, wheat varieties are zoned and planted in large areas in the northern regions of the country: 22 varieties - in the southern regions, 31 ones - in the central regions, and 22 ones - in the Fergana Valley.

Seed production of winter wheat varieties in the context of the Republic of Karakalpakstan, created under local conditions, resistant to unfavorable weather conditions, has been established - Utkir (1.4 ha. 55.2 c/ha), Shortanbay-1 (0.2 ha 52.5 c/ha), Garezsizlik (2.7 ha 50.0 c/ha), Amangul (0.2 ha 47.0 c/ha) and rice Guliston (10 ha 44.4 c/ha) and Nukus-70 (7.9 ha 41.2 c/ha).

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The Intellectual Property Agency of the Republic of Uzbekistan has issued registration numbers for 7 new varieties of winter soft wheat of local production.

Elements of agricultural technology for growing new varieties of winter wheat are regularly studied; recommendations are prepared and distributed during workshops to farms for use in production.

5 varieties of soybeans, 6 varieties of sunflower, 1 hybrid of corn, 5 varieties of corn created at the Institute are included in the State Register.

Positive results have been achieved in scientific, practical and innovative research at the Institute and are applied in the country:

- promising varieties of winter soft and durum wheat, recommended for new crops, taking into account the soil and climatic conditions of the country are selected, on a scientific basis, elements of agricultural technology for their regional cultivation are developed;
- a system of primary sowing of new high-yielding pea varieties for autumn cultivation (Cuce ariec) has been created;
- new varieties and hybrids of winter soft wheat have been created, resistant to cold, drought, salt, diseases, high yields, suitable for irrigated regions of the country are created, and their primary seed system has been organized;
- the scientific foundations of the ecological, agrotechnical and economic efficiency of biological agriculture have been developed in preventing soil degradation and increasing the efficiency of using natural resources;
- a system of primary seed production of new promising mid-ripening, high-yielding, fodder local soybean varieties Baraka, Ustoz MM-60 has been created;
- developed agrotechnics for repeated cultivation of forage crops in different regions of the country in order to preserve soil fertility in a reasonable time.

It is known that the sowing of winter grain crops is ripen in the climatic conditions of the region mainly in the first and second decades of June. In recent years, a sharp increase in air temperature has been observed in June. Therefore, our scientists are working on the creation of intensive, early maturing varieties of cereals, high-quality varieties that ripen by the end of May, high-quality, low-water and low-nutrition varieties, low-growing and semi-normal. As a result of several years of research, 2 ultra-fast winter wheat varieties have been created. In 2021-2025, it is planned to develop and introduce agronomic technologies for the breeding and cultivation of newly created ultra-early varieties.

Every year the Institute prepares 450 tons of seeds of winter wheat raw materials and delivers them to research and experimental stations and seed-production farms in all regions of the country for seed reproduction.

The Institute and its regional branches, experimental stations implement plans for growing high-generation seeds, set forth in Annex 3-4 to the annual resolution of the President of the Republic of Uzbekistan *On Organizational Measures for Winter Sowing, Varietal Placement and Procurement of Grain Crops,* in excess every year. The country's grain farms were supplied with high-generation seedlings and super-elite seeds of 6,585 tons in 2017, 6,585 tons in 2018, 6,585 tons in 2019, 6,585 tons in 2020.

International cooperation is carried out with the All-Russian Scientific Research Institute of Oilseeds named after V.S. Pustovoit, the Russian Federation, and the National Grain Center named after P.P. Lukyanenko in Krasnodar, together with whom the Road Map has been compiled for the development of agriculture in the country.

FERGANA REGION

Administrative center	Fergana
Administrative divisions	15 districts
KKhokim	Khairullo Khayiutbaevich Bozorov
Area	6 800 km² (ranked 10th)
Population	3 782 200 people (ranked 2nd)
Largest cities	Fergana, Kokand, Margilan
GRP output	32 943.3 billion UZS (ranked 5th)
GRP structure	Agriculture, forestry and fisheries – 17.3% Industry – 31.3% Construction – 6.5% Trade and services sector – 44.9
Key Indicators of the Development of the Scientific & Technological Potential and Innovationsin Fergana Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary education institutions	10
Number of institutions with a postgraduate education system	3
Number of doctoral/postdoctoral students	37
PhD/Ds applicants graduated	1/0
Number of institutions engaged in R&D	15
Size of R&D financing	6 156.5 million UZS
Number of employees engaged in R&D	231
Number of implemented technological innovations	89
Number of new technologies acquired by institutions	737

Background

On January 15, 1938, the Fergana region was formed with the center in the city of Fergana. Until 1941, the region included 30 districts, 7 cities and 2 urban-type settlements.

Fergana region existed within those borders for about two years, however, by the Decree of the Presidium of the Supreme Soviet of the USSR dated March 6, 1941, Andijan, Fergana and Namangan regions were formed. By this decree, the borders of the Fergana region decreased by 3 times.

In 1926-1930, Fergana region was considered a district as an administrative-territorial unit of the Uzbek SSR. As of 1929, the county was divided into 9 districts. Like most districts of the USSR, on July 30, 1930, the Fergana district was abolished. Its districts fell under the direct control of the Uzbek SSR.

Fergana is known for the fact that it is the birthplace of the greatest Central Asian astronomer of the 8th - 9th centuries Al-Fergani, who made a huge contribution to astronomy, mathematics and geography. Al-Fergani was one of the first scientists of the Middle Ages to prove the sphericity of the Earth, discovered the

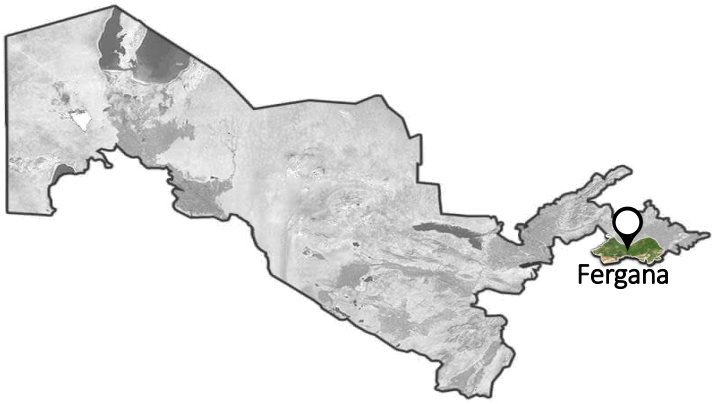
presence of spots on the Sun, identified June 22nd as the longest day of the year and December 23rd as the shortest day.

Region's Economy

Fergana Region has an economically advantageous geographical location: it borders on Kyrgyzstan on the eastern and southern sides and on Tajikistan on the western side.

Fergana has a central bus station and an international airport. In addition, the railway lines connecting the Fergana Valley with the capital pass through Fergana region.

The economic potential of Fergana Region makes it one of the country's leaders. The bowels of the valley contain various types of minerals: oil, uranium, granite, marble, gypsum, etc. The region has the largest mining, metallurgical, chemical, energy, oil and gas, machine-building enterprises, factories for the production of building materials. The textile, clothing and knitwear industries are well developed.



Fergana is one of the most industrially developed cities. In the region, success has been achieved in the leading sectors of the fuel and energy, chemical, engineering, construction materials, cotton ginning and processing, light, food and other industries.

At present, 38 large industrial enterprises, 7930 small industrial enterprises, 446 joint ventures make a worthy contribution to the renewal of Fergana's life and turning it into a prosperous metropolis. Examples include the Fergana refinery (FR), AZOT Production Association, Kuvasay Quartz Joint-Stock Company, Eurasia TAPO-Disk, Avtooyna and Daewoo Tekstil joint ventures.

Foreign investments are attracted to enterprises and organizations of the region; high-quality world-class products are produced on modern equipment. They export oil, cotton, food, canned food, construction materials, car wheels, spare parts, agricultural products and other goods to foreign countries.

Reforms in the cotton, grain, silkworm production, horticultural and livestock sectors, which are the main agricultural sectors in the region, are also yielding positive results. In the villages, urban-type houses have been built, in the most remote villages, sports facilities, music and art institutions for young people have been constructed.

In the industrial sector, a special place is occupied by the chemical, oil refining, food, light, furniture industry, production of building materials, mechanical engineering and metalworking, electronics.

The main types of industrial goods are petroleum products, agricultural fertilizers, glass and glass products, cement, various electrical appliances and mechanisms, auto parts, etc.

There are 3-4 relatively large and about 20 small and medium enterprises operating in the city, among them:

- Fergana Oil Refinery (oil industry),
- Ferganaazot (chemical industry),
- Electromash.

Currently *(as of September 1, 2019),* 85 enterprises with Russian investments operate in Fergana, of which 43 work in various industries, the rest in agriculture, services, trade and construction.

Fergana region takes a leading place in Uzbekistan in the export of agricultural and industrial products. 564.4 thousand hectares have been allocated for agriculture, and special attention is paid to the cultivation of melons, grapes, potatoes, and other vegetables and fruits.

Favorable conditions are formed for foreign investors, preferences and benefits are approved. In 2018, 68 enterprises with foreign capital were created, their total number has now reached more than 350 ones. In general, the volume of attracted foreign direct investment over the past 2 years has increased 5 times. Agreements have been signed on 36 projects totaling 1.1 billion US dollars, of which almost 960 million US dollars are foreign funds.

There is a free economic zone (Kokand), as well as small industrial zones in the cities of Margilan, Kuvasay, Kokand, and Fergana.

Development of Scientific and Innovative Activities in the Region

Nine higher educational institutions and one research Institute carry out scientific and innovative activities in the region.

1. Fergana State University

By the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan *On the Establishment of Fergana State University* dated March 1, 1991, Fergana Pedagogical Institute, which had existed since 1930, was given the status of Fergana State University. Today, FSU is considered one of the leading higher educational institutions in Uzbekistan. As a university with a solid material base, it prepares highly qualified specialists for various sectors of the national economy, the education system, and carries out research work in fundamental areas of science.

Rector	Prof. Ravshan Khasanovich Maksudov, D.Sc. in Engineering
Vice-Rector for Research and Innovationss	Associate Prof. Akmaljon Akhmadjonovich Urinov, Ph.D. in Economics
Number of students	19,995
Number of teaching professors	756
of them, academic degrees are held by	198 (30 D.Sc. + 168 Ph.D.)

Faculties	1. Mathematics and Physics 2. Pedagogy and Psychology 3. Preschool and Primary Education 4. Natural Sciences 5. Animal Science 6. Physical Education 7. Philology 8. History 9. Foreign Languages 10. Military Training 11. Socio-Economic 12. Art History 13. Fruit Growing and Horticulture

Currently, the university has about 20,000 students, 358 undergraduates and 44 doctoral students in 53 specialties.

In 2020, the research staff of the Institute successfully defended 27 (PhD) and 3 (DSc) doctoral dissertations.

Under 17 economic contracts, research activities being carried out in 38 areas as follows:

- Natural resources of the Fergana Valley and their efficient use;
- Regional environmental problems and study thereof;
- Geo-ecological basis for improving the system of protected natural areas;
- Improving the fertility of irrigated soils in the Fergana Valley;
- Impact of legumes on the biogeocenosis of low, moderate and high crustaceans;
- The level of phenotypic changes depending on the cultivation conditions of different varieties of cotton;
- Promising fodder plants of the Galloper family, spreading in the Fergana Valley in Uzbekistan;
- Development of geo-ecological grounds for biodiversity conservation;
- Development of geo-ecological grounds for organizing a system of protected natural areas; Implementation of hydrometeorological research on climate change;
- Biomonitoring of distribution, development, ecological characteristics of agricultural crops, etc.

In the period 2019-2020, professors and teachers of the University published more than 5780 academic papers, of which:

- 48 papers in scientific journals included in the Scopus, Web of Science databases;
- 618 papers in other foreign scientific journals;
- 542 papers in republican scientific journals, reviewed by the Higher Attestation Commission;
- 912 papers in other republican scientific journals;
- 1,516 abstracts in collections and proceedings of international conferences;
- 1,852 abstracts in collections and proceedings of national conferences;

- 293 monographs, teaching aids, textbooks, textbooks of methods.

Also, within the framework of research activities, 88 documents of title were obtained, of which:

- 2 patents for a utility model;
- 2 patents for invention;
- 1 patent for an industrial design;
- 33 authorship certificates for a software product;
- 50 authorship certificates for a trademark.

In addition, 54 applications for documents of title were submitted.

2. Fergana Polytechnic Institute

Fergana Polytechnic Institute is one of the largest higher educational institutions of the Republic of Uzbekistan. It was founded in 1967 by the decision of the Ministry of Higher and Secondary Specialized Education in order to train young personnel for leading enterprises of the chemical and petrochemical industries in the region and beyond. Today, the Institute also carries out research activities in mechanical engineering, power industry, chemistry, and economics.

Rector	Oybek Khamdamovich Otakulov
Vice-Rector for Research and Innovationss	Zokhidbek Abdusamadovich Khamrakulov
Number of students	8,786
Number of teaching professors	572
of them, academic degrees are held by	137 (19 D.Sc. + 118 Ph.D.)
Faculties	1. Construction 2. Mechanics and Mechanical Engineering 3. Power Industry 4. Management in Production 5. Chemical Technology 6. Consumer Goods and Textile Industry

At the Institute, as of December 1, 2020, there are 8 786 students in 31 areas, and 307 undergraduates in 12 specialties, 36 basic doctoral students in 18 specialties and 41 independent researchers in 18 areas.

In the period 2017-2020, professors and researchers of the Institute defended more than 20 Ph.D. and 3 doctoral dissertations.

Researchers and scientists of the Institute annually implement scientific and innovative projects within the framework of state scientific and technical research programs, created on the basis of a state order.

In 2020, the following projects were implemented:

- 1 fundamental project for the amount of 107,603,000 UZS;
- 2 applied projects for the amount of 272 442 000 UZS;

- 2 international projects for the amount of 171,000 euros;
- 2 start-up projects for the amount of 1,759,000,000 UZS.

Within the framework of implemented projects, 118 commercial contracts were signed for the amount of 904,038,371 UZS, 7 patents were obtained.

In 2020, professors and teachers of the Institute published 2,442 academic papers, of which:

- 41 papers in journals included in the Web of Science, Scopus databases;
- 661 papers in international scientific journals;
- 376 papers in republican scientific journals;
- 1 185 abstracts in the collections and proceedings of international and national conferences;
- 60 textbooks and teaching aids;
- 78 monographs.

3. Fergana branch of the Tashkent University of Information Technologies

The Ferghana branch of the Tashkent University of Information Technologies was established by Resolution No. PP-91 of the President of the Republic of Uzbekistan dated June 2, 2005. According to Resolution No. PP-1942 of the President of the Republic of Uzbekistan *On Measures to Further Improve the System of Personnel Training in the Field of Information and Communication Technologies* dated March 26, 2013, in recent years, a number of measures have been carried out to radically improve the system of training highly qualified specialists in the field of ICT at the level of international standards.

Director	Prof. Akbarali Makhamatovich Rasulov, D.Sc. in Engineering
Deputy Director for Research and Innovation	Bakhromjon Odiljonovich Djalilov
Number of students	2,223
Number of teaching professors	107
of them, academic degrees are held by	40 (3 D.Sc. + 37 Ph.D.)
Faculties	1. Computer Engineering 2. Telecommunication technology and Professional 3. Training

The branch includes 2 faculties, 8 departments. Personnel is traned in 5 areas of education, including 2 new areas of bachelor's degree program.

In 2021, 5 independent researchers plan to defend their dissertations.

Currently, young scientists are implementing fundamental, applied and startup projects:

1. BA5-035 - Applied project *Research of the Detector of Charged Particles Flux and the Development of an Information-Measuring Complex for Predicting Earthquakes on its Base* (2018).
2. OT-F-3-19 - Fundamental project *Development of Fundamental Research on the Creation of Modular Systems of New Types of Parabolic Cylindrical Concentrators for Solar Power Plants Based on Thermal Cycles of Energy Change* (2019).
3. Startup project *Development of Teaching Methods of Visual Programming for Secondary and Secondary Specialized Educational Institutions* (2019).

In accordance with Decree No. PP-6079of the President of the Republic of Uzbekistan dated October 5, 2020, within the framework of the state program "*Digital Uzbekistan 2030",* in Yazyavan and Bagdad districts, the implementation of 5 projects has been agreed, for which 484 million UZS have been allocated from the local budget. These projects are implemented by the TUIT Fergana Branch in collaboration with the Center for Digital Techologies IM Soft LLC.

About 10 projects from the industry are being prepared for the 33rd competition round of innovative projects within the framework of the State Programs for Scientific Activity in 2020 and programs of practical and innovative projects for young scientists.

To participate in the competition of applied research of the Ministry of Innovative Development of the Republic of Uzbekistan, the implementation of which is provided for 2021-2025, the Branch Council recommended the following projects:

1. Creation of a software and hardware complex for earthquake prediction based on the measurement of charged particles and neutron currents.
2. Methodology for the development of educational and cognitive competencies of students on the basis of mathematical modeling (on the example of the Higher School).

In total, within the framework of research, 5 papers have been published in scientific journals included in the Scopus and Web of Science list.

In 2019-2020, teaching professors of the Branch obtained the following documents of title:

- 3 patents for inventions;
- 42 authorship certificates for a software product.

Economic agreement No. 429 "U" for the amount of 100 million UZS was signed with the Fergana International Airport.

The Branch has 17 project teams and 2 innovation groups for gifted students. The teams and groups are supervized by 20 professors and lecturers.

The team of the Fergana branch of the Tashkent University of Information Technologies took part in the regional programming contests *Uzbekistan and Tajikistan* and was awarded with certificates and diplomas. The team took first place in the competition *100 best innovative projects created by women in Uzbekistan*.

Cooperation has been established with the following state-owned and economic organizations, including the Ferghana branch of JSC Uzbektelecom, Andijan branch of JSC Uzbektelecom, Namangan branch of JSC Uzbektelecom, Fergana International Airport, Ferghanaazot JSC, MIR Group Enterprises LLC, Fergana Oil Refinery, Scientific and Production Association "Solar Physics" of the Academy of Sciences of the Republic of

Uzbekistan, UE Center for Digital Technologies under the KKhokimiyat of Fergana region, Fergana branch of JSC Uzbekiston Pochtasi, Kokand Oil and Fat Factory, JV UZSUNGWOO, Fergana branch of the Electrotechnical Adaptation Service, Fergana Regional Branch of the JSCB Aloqabank, Fergana Regional Center of Public Services, Web-Bozor LLC, Global Tech LLC, International Software LLC, Visual Soft Solutions LLC.

It is planned to create a Clearinghouse based on an investment of 1 million US dollars donated to theBranch by Korean NIA.

In addition, over the past 3 years, cooperation agreements have been signed withNovgorod State University, Moscow Technical University of Communications and Informatics, St. Petersburg State Electrotechnical University LETI named after V.I. Ulyanov, Ferris University, St. Petersburg State University of Telecommunications named after prof. M.A. Bonch-Bruevich, which are included in the TOP-100 universities.

4. Fergana branch of Tashkent Medical Academy

The Fergana Branch of Tashkent Medical Academy was created on the basis of the Medical Center at Fergana State University by Resolution No. 239 of the Cabinet of Ministers dated June 3, 1998. Now, the Branch is working with medical training schools of the Republic of Uzbekistan, and in the following specialties: *Medical and Educational Activities*, *Treatment-and-Prophylactic Case* and *Higher Medical Service*, *General Practitioner*, *Physician*, *General Hygienist-Epidemiologist* and *Highly-Qualified Nurse*.

Director	Gafurjon Nematbekovich Sultanov
Deputy Director for Research and Innovation	Shakhnoza Anvarovna Normatova
Number of students	2,366 + 81 residents in clinical residency
Number of teaching professors	197
of them, academic degrees are held by	52 (11 D.Sc. + 41 Ph.D.)
Faculties	1. General Medicine 2. Preventive Medicine 3. International Faculty

Currently, the branch has 15 classrooms with video bikers, computers and video projectors, including 8 specialized equipped educational laboratories.

Scientific research includes the study of the impact of environmental and industrial factors on the health of the population and workers, the development of measures to protect them, the ecological state of various districts of the region, the sanitary state of water, air and soil.

In 2020, research activities were carried out in the following areas:

- study of the state of health of the population, habitat;

- identification of risk factors and development of a complex of pre-nosological measures to improve the quality of life of various groups of the population of the Fergana Valley.

The research projects of all departments in this area have been approved and currently, the research is being carried out by 10 independent researchers, 2 basic doctoral students, 1 intern-researcher.

Nine months into 2020, 3 PhD and 1 DSc dissertations were defended, and a few more PhD dissertations will be defended before the end of the year.

In 2020, the research activities carried out at the Branch resulted in publishing:

- 165 papers in foreign scientific journals (15 journals are included in the Scopus database) and in more than 50 domestic scientific journals;
- more than 300 papers and abstracts in the collections and proceedings of conferences and forums;
- 5 monographs;
- 3 teaching aids.

Also, 15 authorship certificates were obtained.

A memorandum of cooperation was signed between the Academy and Azerbaijan Medical University. Currently, cooperation with the departments of Communal and Food Hygiene, Epidemiology of this university continues.

5. Kokand State Pedagogical Institute

Kokand State Pedagogical Institute named after Mukimi was founded in January 1931 as an evening pedagogical Institute. The Institute was reorganized into the Day State Institute of Teachers from 1939-1940. In 1943, it was transformed into the Institute of Women Teachers, and in 1954, it was converted into the State Women Pedagogical Institute.

Today, Kokand State Pedagogical Institute is one of the largest pedagogical institutions in the country, where modern pedagogical personnel are trained. At present, the Institute has its own modern material and technical base, 269 modern classrooms and 21 educational laboratories, equipped subject to modern requirements.

Rector	Mamirjon Yusupovich Atadjanov
Vice-Rector for Research and Innovationss	Dilmoza Shavkatovna Khodjaeva
Number of students	11,462
Number of teaching professors	451
of them, academic degrees are held by	32 (7 D.Sc. + 25 Ph.D.)
Faculties	1. Mathematics and Physics 2. Uzbek Language and Literature 3. Natural Sciences 4. History 5. Pedagogy and Psychology

6. Physical Education
7. Preschool Education
8. Foreign Languages
9. Art
10. Russian Language and Literature
11. Primary Education

In the period 2018 to 2020, at Kokand State Pedagogical Institute, 12 teachers were awarded the academic title of associate professor. Over the years, 26 doctoral dissertations (PhD) and 1 doctoral dissertation (DSc) have been defended.

In 2018 to 2020, the following projects were implemented:

1. ERASMUS + JP - ModeHEd *Modernizing Health Education in the Uzbek Universities* (funds in the amount of 14,500.00 euros were received).
2. 574097-EPP-1-2016-1-CY-EPPKA2-CBHE-JP RUECVET: *Piloting the European credit transfer system for vocational education and training in Russia and Uzbekistan* (funds in the amount of 47,500 euros were received).
3. The Institute is currently implementing the project ACCESS MICROSCHOLARSHIP of the Bureau for Educational and Cultural Affairs of the US State Department. The project cost is 50 million US dollars.

The project *Natural Nutritional Base for Growing Commercial Fish Young Fry - Methods of Reproduction of Planktonic Organisms and Their Practical Value* for 400 million UZS was recognized the best among innovative projects scheduled for the years 2019-2020 of the Ministry of Innovative Development of the Republic of Uzbekistan.

To date, applications for participation in the state competition of research projects have been submitted for 6 projects:

- Motor Transport Cleaning the Environment (the project cost is 181 million UZS);
- Uzbek Hero in Belarus (war hero Mamadali Topvoldiev) (the project cost is 350 million UZS);
- Conducting a Psychological Analysis of the Disintegration of the Family in Society (the project cost is 250 million UZS), and others.

In the 2017 academic year, the Institute published:

- 116 papers in international scientific journals;
- 21 papers in prestigious republican scientific journals;
- 9 collections of scientific and methodological papers;
- 36 textbooks and teaching aids;
- 4 monographs;
- 4 patents.

In the 2018 academic year, the Institute published:

- 100 papers in international scientific journals;

- 86 papers in scientific journals included in the list of periodicals recommended by the Higher Attestation Commission;
- 789 papers in 11 collections of scientific and methodological papers;
- 41 textbooks and teaching aids;
- 4 monographs;
- 2 patents.

In the 2019 academic year, the Institute published:

- 75 papers in journals included in the Web of Science, Scopus databases;
- 124 papers in international scientific journals;
- 144 papers in scientific journals included in the list of periodicals recommended by the Higher Attestation Commission;
- 750 papers in 3 collections of scientific and methodological papers;
- 18 monographs;
- 5 patents were obtained;
- 36 authorship certificates were obtained.

In 2020, the researchers of the Institute obtained documents of title:

- 1 international patent for a utility model;
- 1 authorship certificate for a software product.

In accordance with Resolution No. PP-3968 of the President of the Republic of Uzbekistan *On Additional Measures to Improve the Mechanisms for Introducing Innovations in the Industries and Sectors of Economy* dated May 7, 2018 and Instruction No. 24/1-160 of the Cabinet of Ministers of the Republic of Uzbekistan dated May 10, 2018, Order No. 414 of the Minister of Higher and Secondary Specialized Education of the Republic of Uzbekistan dated May 12, 2018, and Order No. 594 of the Minister of Higher and Secondary Specialized Education of the Republic of Uzbekistan *On Approval of the Regulations on the Department of Commercialization of Research Results in Higher Education institutions* dated July 5, 2018, and Order No. 423 of the Rector of the Institute dated July 11, 2018, the Department of Commercialization of Research and Innovative Activities was created at the Institute, so was the “Innovation Fund”.

In total, in 2019, funds in the amount of 70 million UZS were attracted in the Innovation Fund. More than 58 million UZS from this amount were spent. The disbursed funds, mainly in the amount of 50% of the funds received (29 million UZS), were used to pay wages on an hourly basis to the teaching professors who raised these funds.

At present, the balance on the account of the Innovation Fund is 12,662,081 UZS.

Over the last three years, 12 republican and 1 international conferences were held.

Senior Lecturer of the Department of General Pedagogy and Psychology Atkham Nisolmukhammatovich Ziyayev published a textbook on the subject *General Pedagogy (Theory of Education)*. This textbook was approved for publication in accordance with Order No. 285 of the Ministry of Higher and Secondary Specialized Education of the Republic of Uzbekistan dated May 4, 2020.

Associate Professor of the Department of Primary Education, Ph.D. in Philology Rashid Shukurov obtained Certificate No. 02260 *On Copyright Deposit* of the IP Consulting Center for his learning aid *Educational Dictionary.*

6. Kokand branch of Tashkent State Technical University

In accordance with Resolution No. 754 of the Cabinet of Ministers of the Republic of Uzbekistan *On the Establishment of the Kokand Branch of Tashkent State Technical University Named after Islam Karimov* dated September 22, 2018, the Kokand branch of Tashkent State Technical University named after Islam Karimov was created. Currently, the branch has one faculty - "Electronics and Electrical Engineering" and the Department of General Mathematical, Natural Science and General Professional Disciplines of the same faculty.

Director	Sharifjon Yigitalievich Pulatov
Deputy Director for Research and Innovation	Bakhtiyor Alishevich Kushimov
Number of students	631
Number of teaching professors	22
of them, academic degrees are held by	7 (2 D.Sc. + 5 Ph.D.)
Faculty	1. Electronics and Electrical Engineering

The Kokand branch of Tashkent State Technical University named after Islam Karimov has five areas of undergraduate study. These include:

1. Electrical engineering, Electromechanics & Electrical Engineering (by industry);
2. Electronics and Devices (by industry);
3. Materials Science and Technology of New Materials (by industry);
4. Technological Machines and Equipment (by industry);
5. Technologies for the Production of Electronic Devices;

In 2020, one of the senior lecturers successfully gained the degree of D.Sc. in Philosophy (PhD) in History and received the approval of the Higher Attestation Commission under the Cabinet of Ministers of the Republic of Uzbekistan.

In order to increase the scientific potential, in 2019, 3 young specialists of the University took part in a competition for full-time postgraduate study.

3 young specialists of the Branch applied to participate in the announced competition for basic doctoral studies for 2021.

In 2019, the number of independent researchers in the Branch was one person, and in 2020, their number reached eight people.

In 2020, professors and teachers of the Branch published:

- 2 papers in foreign periodicals with a high impact factor, included in the “Scopus” and “Web of Science” systems;
- 9 papers in other foreign journals;
- 15 papers in republican journals included in the list of the Higher Attestation Commission;

One authorship certificate was obtained for a computer program, and one application for a utility model was filed.

Two projects prepared by students of the Branch were submitted to the competition for innovative start-up projects for youth.

In 2020, professors and teachers of the Branch published 2 monographs, 2 teaching aids and created more than 10 study guides.

Over the past 2 years, the Branch has established partnerships with 3 foreign higher education institutions.

In addition, one student of the Branch took part in the International Contest in Kazakhstan where he demonstrated good results.

In 2020, at the initiative of the Ministry of Innovative Development of the Republic of Uzbekistan, two students received certificates of participants in the conference *The Role of Student Activity in the Development of Modern Science.*

7. Fergana Regional Branch of the State Institute of Art and Culture of Uzbekistan

The Fergana Regional Branch of the State Institute of Art and Culture of Uzbekistan was organized on the initiative of the President of the Republic of Uzbekistan on August 16, 2017.

Director	Prof. Shamsiddin Yulchiboevich Usmonov
Deputy Director for Research and Innovation	Rashid Mukhtorovich Turgunbaev
Number of students	575
Number of teaching professors	26
of them, academic degrees are held by	-
Faculties	1. Dramatic Art and Folk Art

In the period 2019 to 2020, the Institute concluded 2 economic contracts.

Currently, research activities are carried out in *Dramatic Art.*

The teachers of the Institute submitted 2 project applications for participation in grant programs:

- UNESCO (CL/4301) - *Books for Supporting Transmission of Intangible Cultural Heritage from Generation to Generation;*

- Japan's technical cooperation – *Educational Theater for Advanced Training of Future Actors*.

In the period 2019 to 2020, professors and teachers of the Branch published 172 academic papers, of which:

- 6 papers in scientific journals included in the Scopus, Web of Science databases;
- 25 papers in other foreign scientific journals;
- 33 papers in republican scientific journals, reviewed by the Higher Attestation Commission;
- 45 papers in other republican scientific journals;
- 16 abstracts in collections and proceedings of international conferences;
- 33 abstracts in collections and proceedings of national conferences;
- 14 monographs, teaching aids, textbooks, textbooks of methods.

Also, in the period 2019 to 2020, within the framework of ongoing research activities, 1 authorship certificate for a software product was obtained.

On December 22, 2020, a certificate of deposit of a copyright-protected item for a collection of musical compositions with no lyrics called *Kungil Taronalari* was issued to the senior teacher of the Branch R. Akhmedov.

8. Branch of the Latvian Higher School of Information Systems Management

The branch of the Latvian Higher School of Information Systems Management in the city of Fergana has been operating since September 2018 in accordance with Resolution No. PP-3952 of the President of the Republic of Uzbekistan *On the Establishment of a Branch of the Latvian Higher School of Information Systems Management in the city of Fergana* dated September 26, 2018.

Rector	Prof. Roman Igorevich Dyakov, DSc, academician
Vice-Rector for Research and Innovationss	Akmal Shukhratovich Khudaykulov, PhD
Number of students	175
Number of teaching professors	11
of them, academic degrees are held by	8 (2 D.Sc. + 6 Ph.D.)
Faculties	1. Business Administration 2. Business Administration in Tourist Industry 3. Information Systems

The Branch was created in order to further develop and improve the training of highly qualified personnel for the tourist industry of the country, to expand international cooperation in the field of higher education, as well as in accordance with the Action Strategy in five priority areas of development of the Republic of Uzbekistan.

- training of highly qualified personnel at the level of international educational standards so that they will be capable of solving the most important tasks for the development of the tourist industry in the country;
- conducting applied and innovative research in the field of tourism and hospitality;
- developing the system of training specialists and academic personnel through the continuity of education and science, as well as mandatory integration into the world educational and scientific community;
- developing and implementing new educational programs and forms of education aimed at improving and modernizing the personnel training system;
- support for the development of pedagogical potential, active improvement of pedagogical technologies and teaching methods;
- developing and strengthening of long-term relations with leading educational institutions, research centers and business communities of foreign countries in the education and research sectors.

In the period 2019 to 2020, professors and teachers of the Branch published 16 academic papers, of which:

- 2 papers in scientific journals included in the Scopus, Web of Science databases;
- 4 papers in other foreign scientific journals;
- 2 papers in republican scientific journals, reviewed by the Higher Attestation Commission;
- 2 papers in other republican scientific journals;
- 3 abstracts in collections and proceedings of international conferences;
- 2 abstracts in collections and proceedings of national conferences;
- 1 monograph.

9. Kokand University

Kokand University is the first non-state university in Fergana Region. The University was established by Resolution No. 683 of the Cabinet of Ministers of the Republic of Uzbekistan *On the Establishment of Kokand University* dated August 17, 2019 in cooperation with Woosong University (South Korea).

Rector	Associate Prof. Sherzod Igamberdievich Mustafakulov, D.Sc., Economics
Vice-Rector for Research and Innovationss	Bekzod Ergashevich Ochilov, D.Sc., Jurisprudence
Number of students	700
Number of teaching professors	80
of them, academic degrees are held by	16 (5 D.Sc. + 11 Ph.D.)
Faculties	1. Business 2. Education

The activities of the University in sub-areas are supervised by individual departments:

1. Department of Academic Affairs;
2. Department of Research Activities;
3. Department for Work with Youth, Spiritual and Educational Activities;
4. Department of Strategic Planning and Development;
5. Department of Operations Management.

In order to improve the efficiency of the educational process, the following centers have been organized at the University:

1. Information Resource Center of the University;
2. Center for Information Technologies of the University;
3. Center for Providing Services to Students;
4. Center for Innovative Educational Technologies;
5. The main areas of student training are the humanities and social sciences.

Also, in order to increase the involvement of students in research and innovation, research centers have been established at the University:

1. Center for Research on Global Development;
2. Center for Korean Language and Culture;
3. Center for Digital Technologies and Digital Economy.

Kokand University has established collaborative relationships with universities in the United States, Japan, France, South Korea, Turkey, Indonesia, Poland, Kazakhstan and the Czech Republic. In particular, the University signed an agreement on a student exchange program with Karabuk University (Turkey) and Al-Farabi National University (KazNU, Kazakhstan). In addition, negotiations are underway with Wroclaw University of Business (Poland), Antalya University of Science (Turkey), Almaty Academy of Economics and Statistics (Kazakhstan), Johnson and Wales University (USA), Hood College (USA), Gadja Mada University (Indonesia), York College (USA), Jungbu University, Aju University (South Korea) and many other prestigious foreign institutions for student exchange programs and joint educational programs.

10. Uzbek Research Institute of Natural Fiber

In connection with the expansion of the scope of the Institute and on the basis of Letter of Consent of the “Uzbek Ipagi” Association No.3/15-5-398 dated April 5, 2005, as well as by the Resolution of the Fergana Regional Committee for State Property Management, by Order No. 9616/012-2 dated September 8, 2005, the Margilan ‘Shoyi” Research Institute, on the basis of Order No.118 dated October 17, 2005, was closed and renamed as Uzbek Research Institute of Natural Fiber (UzNIINV). By Resolution No. PP-512 of the President of the Republic of Uzbekistan *On Measures to Further Reform the Silk Industry of the Country* dated November 15, 2006, UzNIINV is included in the State-owned Joint Stock Company Uzbekyengilsanoat (Uzlegprom). At present, the Institute is part of the Uztukimachiliksanoat Association.

Director	Prof. Okhunjon Abdurakhmanovich Akhunbabaev, D.Sc.in Engineering
Deputy Director for Research and Innovation	Muhammadkarim Mirzakhonov
Number of employees	62
of them, academic degrees are held by	15 (7 D.Sc. + 8 Ph.D.)

The research activities of the Institute include: improving the methods and technology for the production and processing of textile fibers and materials, creating new structures, improving quality, standardizing products, certification, product quality management and expanding the range of textile materials and products, rational use of textile raw and other materials, technical regulation and increase in the efficiency of production of textile products.

In 2020, 1 employee of the Institute successfully defended his thesis for the degree of D.Sc. in Philosophy (PhD) in engineering.

Research activities at the Institute is carried out in the following areas:

- research, development and implementation of new technologies in the field of production and processing of natural (cotton, wool, natural silk, flax, etc.) and chemical (artificial and synthetic) fibers;
- development of regulatory and technical documents in the field of standardization, metrology of textile products;
- development and creation of new agricultural technologies in the growing and processing of natural fibers.

In the period 2019 to 2020, research work within the framework of state grant programs were completed:

- 1 innovative project;
- 1 fundamental project;
- 8 applied projects.

In 2020, 8 project applications were submitted for participation in state grant programs, 1 application was submitted for participation in the international grant program of the Green Climate Fund.

In 2019-2020, professors and teachers of the Institute published 172 academic papers, of which:

- 1 paper in scientific journals included in the Scopus, Web of Science databases;
- 3 papers in other foreign scientific journals;
- 24 papers in republican scientific journals, reviewed by the Higher Attestation Commission;
- 1 paper in other republican scientific journals;
- 41 abstracts in collections and proceedings of international conferences;
- 98 abstracts in collections and proceedings of national conferences;
- 4 monographs, teaching aids, textbooks, textbooks of methods.

Also, in the period 2019 to 2020, as part of ongoing research activities, 2 patents for a utility model and 2 patents for an invention were obtained. Three applications were submitted for obtaining titles of protection.

FERGANA REGION

Based on the Law of the Republic of Uzbekistan *On Public-Private Partnership* dated April 26, 2019, TANG GROUP LLC was created at the Institute, which is engaged in the development and production of knitted products made of natural and chemical fibers, as well as in the installation and maintenance of imported knitting machinery, personnel training, creation of a program for the production of knitwear. With the participation of TANG GROUP LLC, JV FERGANA SILK ROAD Co. LLC was established for production and complex, deep processing of silk, starting with the creation of mulberry plantations and ending with the creation of various products made of natural silk.

NAVOI REGION

Administrative center	Navoi
Administrative divisions	8 districts
KKhokim	Kobil Beknazarovich Tursunov
Area	110 800 km² (ranked 2nd)
Population	1 004 700 people (ranked 12th)
Largest cities	Navoi, Khatyrchi, Kyzyltepa
GRP output	36 658.2 billion UZS (ranked 3rd)
GRP structure	Agriculture, forestry and fisheries – 17.7% Industry – 68% Construction – 4.5% Trade and services sector – 12%
Key Indicators of the Development of the Scientific & Technological Potential and Innovations in Navoi Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary education institutions	2
Number of institutions with a postgraduate education system	3
Number of doctoral/postdoctoral students	32
PhD/Ds applicants graduated	21/2
Number of institutions engaged in R&D	6
Size of R&D financing	63 310.6 million UZS
Number of employees engaged in R&D	764
Number of implemented technological innovations	404
Number of new technologies acquired by institutions	1

Background

By Decree No. 2247-X of the Presidium of the Supreme Council of the Uzbek Soviet Socialist Republic dated April 20, 1982, Navoi Region was formed from parts of Bukhara and Samarkand Regions with the administrative center in the city of Navoi. Kanimekh, Kyzyltepa, Navbakhor, Navoi, Tamdyn and Uchkuduk districts, the cities of Navoi, Zarafshan, Uchkuduk were transferred from Bukhara Region; from Samarkand Region – Nurata and Khatyrchi Districts.

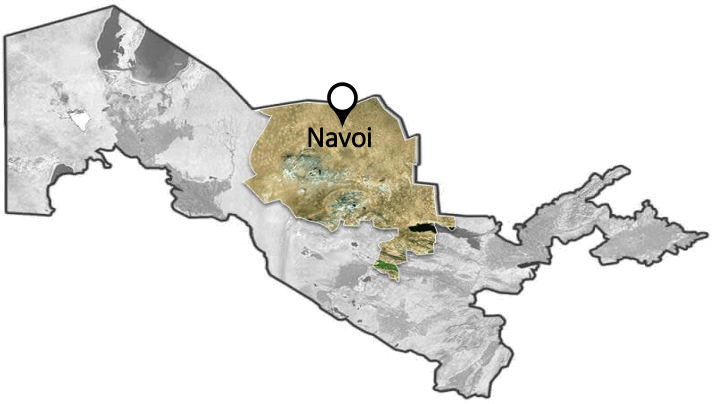
In May 1989, a larger part (7 districts) of the former Navoi Region was transferred to Bukhara Region.

By the Resolution of the Presidium of the Supreme Council of the Republic of Uzbekistan *On the Restoration of Navoi Region as Part of the Republic of Uzbekistan* dated January 27, 1992, Navoi Region was restored (newly formed).

Region's Economy

Navoi is one of the largest transport hubs in Uzbekistan. The Navoi International Airport is located 12 km to the west of the city. The airport has air communication with the Tashkent International Airport named after Islam Karimov and with the airports of other large cities of Uzbekistan, as well as with the Vnukovo International Airport (Moscow). There is a railway station in the south of Navoi, which is important for freight and passenger traffic.

In the bowels of Navoi Region, there are deposits of gold, tungsten, phosphorite, quartz sand, cement raw materials, limestone, oil and gas.



Most of the uranium deposits being developed in Uzbekistan are also located in the region. In the deserts, there are many quarries where uranium is mined and developed.

The leading industries are power industry, mining, metallurgical industry, chemical, cotton ginning, food processing, as well as the production of building materials.

The largest industrial enterprises of the region are Navoi Mining and Metallurgical Combine in Muruntau, Navoi TPP, Navoiazot, Cement Plant, Electrochemistry JSC, and Nuratamarmar.

The presence of goldfields, on the basis of which the gold mining industry arose, is of great importance. The joint Uzbek-American enterprise Zarafshan-Newmont was created by the mining and metallurgical plant to extract gold from rock refuse.

There are 60 state-owned industrial, 10 joint, 728 small (for example, Ittifok, Navoiy, and EDEM) and 30 collective enterprises in the region.

On May 15, 2019, the territory of Navoi Region was recognized as a free economic zone (FEZ) for innovative, high-tech, export-oriented and import-substituting production facilities for the period until January 1, 2030. Enterprises that have the status of a FEZ member are provided with a number of benefits.

Both agriculture and industry play an important role in the region's economy. There are about 500 farms in Navoi Region. The leading branches of agriculture are cotton growing, grain growing, vegetable growing, melon growing, viticulture, karakul sheep breeding, and silkworm breeding.

Livestock farming is considered diversified. Karakul sheep are raised in the region. More than 500,000 pieces of karakul pelts are produced annually (ranked 2nd in the country after Bukhara Region).

Development of Scientific and Innovative Activities in the Region

Scientific and innovative activities in the region are carried out by two higher educational institutions and one branch of the Academy of Sciences of the Republic of Uzbekistan.

1. Navoi State Pedagogical Institute

The Navoi branch of Tashkent State Pedagogical Institute named after Nizami was established by Order No. 1392 of the Council of Ministers of the USSR dated July 25, 1983 and Resolution No. 455 of the Council of Ministers and the Central Committee of the Communist Party of the Uzbek SSR dated July 27, 1983. By the Decree of the President of the Republic of Uzbekistan dated February 28, 1992, it was given the status of Navoi State Pedagogical Institute.

Currently, Navoi State Pedagogical Institute has 8 faculties and 24 departments. The Institute prepares bachelors in 27 areas of study and masters in 17 specialties.

Rector	Prof. Bakhodir Boypulatovich Sobirov, D.Sc. in Engineering
Vice-Rector for Research and Innovationss	Sodik Oltievich Khujjiev, Ph.D. in Biology
Number of students	13,192
Number of teaching professors	500
of them, academic degrees are held by	137 (19 D.Sc. + 118 Ph.D.)
Faculties	1. Mathematics and Physics 2. Natural Sciences 3. History 4. Uzbek Language and Literature 5. Foreign Languages 6. Art History 7. Preschool and Primary Education 8. Physical Education

The buildings of Navoi Pedagogical Institute are in six different locations on the territory of the city; there are 8 educational buildings for a total of 4,370 places, 3 dormitories, 3 outdoor sports grounds, 3 gyms, and 3 student canteens. Currently, the educational buildings of the Institute have 240 educational, auxiliary educational, laboratory rooms and computer rooms, including 145 lecture rooms, 32 classrooms for practical classes, 30 computer rooms, 24 auxiliary educational rooms, 9 chemistry, biology and physics laboratories.

The professors and teachers of the Institute carry out research activities in the following areas:

1. In STEM and Natural Sciences:

- Biotechnology - biological treatment of industrial wastewater;
- Study of the biogeotechnological potential of plants;
- Preparation of biofertilizers from biomass of higher aquatic plants;
- Soil ecology;
- Selection of cotton;
- Ichthyology - the study of anatomical and morphological features of fish;
- Research into the bioecology of commercially important fish;

- Industrial ecology;
- Technology of organic substances and materials based on them;
- Chemical technology and processes, and equipment for the manufacture of food products;
- Chemistry and technology of composite paint and varnish and rubber materials;
- Elementary-particle physics;
- Astrophysics;
- Nuclear physics;
- Theory of Probability and Mathematical Statistics;
- Math modeling;
- Numerical methods and program systems.

2. In social sciences and humanities:

- Theory and methodology of pedagogy (in all areas of study);
- Theory and methodology of physical education and sports;
- Age-related psychology;
- Forensic psychology;
- Applied Psychology;
- Neuropedagogy;
- Social philosophy;
- Natural geography;
- Economic and social geography;
- Regional economy;
- History of Uzbekistan;
- Theory and methodology of the Uzbek language;
- Modern linguistics: areal linguistics;
- Lexicography;
- Terminology;
- Comparative philology. Comparative linguistics;
- Eco-linguistics;
- Folklore studies.

2. Navoi State Mining Institute

To facilitate the development of mining and metallurgical industry in Navoi Region, the extraction and processing of minerals, the training of highly qualified specialists, the President of the Republic of Uzbekistan signed the Decree *On the Establishment of Navoi State Mining Institute* dated July 7, 1995, on the basis of which the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan *On the Creation (Establishment) of Navoi State Mining Institute* was adopted on July 26, 1995.

Rector	Kuvandik Sanakulovich Sanakulov, D.Sc. in Engineering
Vice-Rector for Research and Innovationss	Tulkin Isamurodovich Nurmurodov, D.Sc. in Engineering
Number of students	4,054
Number of teaching professors	230
of them, academic degrees are held by	95 (26 D.Sc. + 69 Ph.D.)
Faculties	1. Mining 2. Energy-Mechanical 3. Chemical and Metallurgical

In 2001, Navoi State Mining Institute won a grant from the International Fund TEMPUS-TASIS of the European Union, participated in the implementation of the project “Distance Learning in Uzbekistan”.

The current Rector of Navoi State Mining Institute, D.Sc. in Engineering Kuvandik Sanakulovich Sanakulov was awarded the highest state award and the title “Hero of Uzbekistan”.

The teaching staff of Navoi State Mining Institute successfully fulfills and carries out the tasks set by the National Program for Personnel Training. Namely, it pays special attention to the quality of teaching students, increasing the scientific potential and qualifications of teachers, widespread introduction of new information and pedagogical technologies into the learning process, creating a new generation of educational literature, improving the quality and volume of research work on the basis of state grants and commercial contracts, intensive development of education, science and industrial integration, widespread introduction of research results into the learning process and in the production, as well as to work with gifted students and the development of international relations.

Due to the scientific and innovation infrastructure created at the Institute, 12 dissertations of professors and teachers were defended in 2018, 20 dissertations were defended in 2019, and 28 dissertations are planned to be defended in 2020.

In the period 2017 to 2018, at all departments of the Institute, modern educational and research laboratories at a cost of 6 million US dollars were formed.

The Institute carries out research work in the mining and metallurgical, chemical, energy industries, mechanical engineering technology and automation management.

In total, in 2020, within the framework of state scientific and technical programs, researchers of the Institute are implementing 7 state grants, during which 17 economic agreements were signed, and 3 international projects totaling 9.4 billion UZS.

At the Institute, it is planned to update the master's degree programs on the basis of resource-efficient technologies of the international project - TEMPUS-TERSID. The total cost of the project is 1,184,372 euros.

In 2019, a modern Technopark was created and the production of two types of means of production for the needs of local enterprises was launched.

So far, the Institute has established cooperation links with foreign leading higher educational establishments in the mining and metallurgical industry, including with the universities of Hamburg-Harburg (Germany), Twente (Holland), with Moscow State Mining University, Moscow Institute of Steel and Alloys, Moscow State Geological Prospecting University, Ural State Technical University, Tomsk Polytechnic University, etc.

3. Navoi branch of the Academy of Sciences of the Republic of Uzbekistan

The Navoi branch of the Academy of Sciences of the Republic of Uzbekistan was established by Decree No. PP-3059 of the President of the Republic of Uzbekistan *On Measures to Organize the Activities of the Navoi Branch of the Academy of Sciences of the Republic of Uzbekistan* dated June 15, 2017.

Chairman	Abdurazak Umirzakovich Mirzaev
Deputy Chairman	Kuvondik Mirzanovich Nurboev
Number of employees	32
Number of researchers	27
of them, academic degrees are held by	13 (5 D.Sc. + 8 Ph.D.)
Areas	1. Mineral and technogenic minerals 2. Mechanical engineering, instrumentation and automation 3. Chemical technology, nanotechnology and agriculture 4. Geology, mining, processing of precious, non-ferrous metals and uranium 5. Renewable energy, energy saving and ecology

So far, on the basis of the Memorandum of Cooperation between the Navoi branch and Elektrokimozavod JSC, the experimental and production ground of the Navoi branch has been created within the premises of the plant, and the production of new import-substituting, made from 100% local raw materials Potassium-

UM, LGMK paste, Gektar complex, stimulant plant regulators ElSMiK, bentonite sulfur and suspension insecticides SIP-70 has been launched.

In the period 2018 to 2020, the products were tested on cotton fields in Navoi, Khorezm, Tashkent and Surkhandarya regions, and an increase in yield by 15-20% was noted.

In addition, scientists of the Navoi branch prepared a 4-5% suspension of bentonite clay powder; an experiment aimed at feeding cotton from leaves with urea fertilizer showed a positive result, it was found that a suspension of bentonite creates a film on a cotton leaf, due to the "sorption" properties of bentonite, absorbs water, and as a result of preventing evaporation, cotton is fed in moderation through microcapillaries in the leaves. It was noted that this innovative technology covers up to 40% of water needs of cotton.

In 2019 to 2020, as part of research activities, employees published 173 academic papers, of which:

- 9 papers in scientific journals included in the Scopus, Web of Science databases;
- 30 papers in other foreign scientific journals;
- 22 papers in republican scientific journals, reviewed by the Higher Attestation Commission;
- 7 papers in other republican scientific journals;
- 35 abstracts in collections and proceedings of international conferences;
- 56 abstracts in collections and proceedings of national conferences;
- 14 monographs, teaching aids, textbooks, textbook of methods.

Over the past 5 years, 5 research development products of scientists of the Navoi branch of the Academy of Sciences, included in the Program for the organization of commercialization of promising scientific developments of scientific organizations in the field of chemistry and biology, have been patented:

- No. IAP 20180398 - *Refueling Components Transmission Device;*
- No. IAP 20180488 - *Method for Beneficiation of Quartz Sand;*
- No. IAP 20180569 - *Method for Preparing Agricultural Crops Seeds for Sowing*;
- No. IAP 57438 - *Production of Graphite Concentrate of the Tashkazgan Deposit Suitable for the Use in Electrical Engineering, Metallurgy and Chemical Industry*;
- No. IAP 20170054 - *Production of Magnesium Oxide (Magnesite) by Complex Processing of Dolomite from the Vaush Deposit*.

Currently, within the framework of state scientific and technical programs, the Navoi branch of the Academy of Sciences is implementing applied and innovative projects on the following topics:

1. Preparation and development of a radiometer based on a large-diameter silicon surface-barrier detector for recording the volumetric activity of radon and the content of radium in the medium under study;
2. Development of technology for the production of commercial carbon black by cleaning soot;
3. Development of a technology for enrichment of graphite ores of the Taskazgan deposit for the production of graphite lubricants;
4. Production and introduction into cotton growing of capsule seeds using bentonite clays;

5. Development of a highly efficient non-waste technology for the production of chemically pure ammonium salts and calcium phosphate with the separation of dispersed soil elements from low-grade phosphorites.

In addition, a memorandum of understanding was signed between the Navoi branch and the Latvian VAO JSC. According to the Memorandum, the mining of phosphate rock in the Aznek field in the Kyzylkum Desert is planned. In addition, memorandums of cooperation were signed with a number of research Institutes and higher educational institutions of Russia, Belarus, the People's Republic of China, the USA, South Korea, Kyrgyzstan and Tajikistan.

BUKHARA REGION

Administrative center	Bukhara
Administrative divisions	11 districts
KKhokim	Utkir Khikmatovich Jumaev
Area	39 400 km² (ranked 3rd)
Population	1 932 500 people (ranked 8th)
Largest cities	Bukhara, Gijduvan, Shafirkan
GRP output	26 695 billion UZS (ranked 7th)
GRP structure	Agriculture, forestry and fisheries – 46% Industry – 17.6% Construction – 7.8% Trade and services sector– 28.6%
Key Indicators of the Development of the Scientific & Technological Potential and Innovations in Bukhara Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary education institutions	4
Number of institutions with a postgraduate education system	4
Number of doctoral/postdoctoral students	135
PhD/Ds applicants graduated	13/5
Number of institutions engaged in R&D	10
Size of R&D financing	11 633.9 million UZS
Number of employees engaged in R&D	344
Number of implemented technological innovations	175
Number of new technologies acquired by institutions	-

Background

Bukhara Region was formed on January 15, 1938. On March 6, 1941, Surkhandarya district was withdrawn from its structure and transformed into Surkhandarya Region. On April 20, 1982, Navoi Region was withdrawn from Bukhara Region, too.

The history of Bukhara goes back centuries. Today, the age of Bukhara is determined as 2500 years, and the first mention was about the capture of the settlement in the 6th century BCE by the Persian king Cyrus. 3 centuries later, Alexander the Great came to the area. There was already a fortress Ark and more than 60 caravanserais (inns), where caravans from India, China and other Oriental countries stayed.

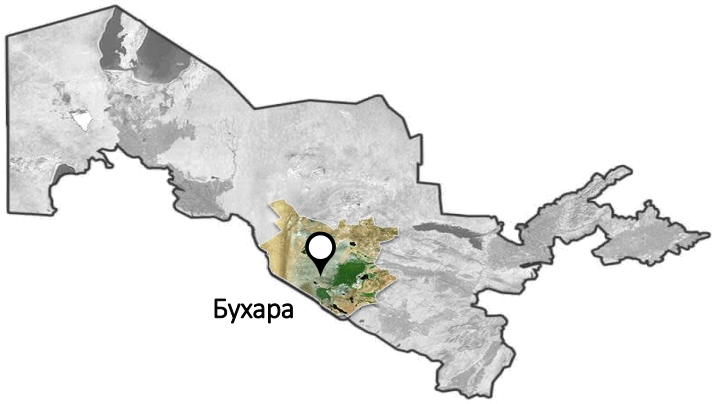
As early as the beginning of the 1st millennium, Bukhara became part of the Kushan kingdom, then it was conquered by the Hephthalite state, and later by the Türkic Kaganate. The most important thing in the history of Bukhara, however, was its capture by the Arabs who came to Central Asia at the beginning of the 7th century. The Arabs brought a new religion – Islam with them.

Later, in the 9th century, the Samanid dynasty came to power. The Samanids made Bukhara the capital of its state, which positively influenced not only the trade and economy of the city, but also became an impetus for the development of science.

Bukhara land can rightfully be proud of its famous creators in various fields of science. The outstanding personalities who worked at different times on the territory of the Bukhara oasis include the scientist-encyclopedist and doctor Abu Ali Ibn Sino, better known in the West as Avicenna, the scientist and poet Omar Khayyam, mathematician Abu Rayhon Beruniy, the great Sufi Bahouddin Naqshbandiy, and many others.

Region's Economy

Railway lines to the cities of Urgench, Tashkent and Andijan pass through Bukhara region. There are also direct flights to Moscow, St. Petersburg, Vladivostok, and Dubai.



Agriculture in the economic sector of Bukhara Region is of key importance: poultry farming, vegetable growing, cotton growing, cattle breeding are well-developed.

Traditional Uzbek crafts are widespread.

The most developed industries are textile industry and food processing. An essential place is occupied by the extraction and processing of oil, natural gas and precious metals.

The Bukhara region has significant natural resources, especially natural gas (most of the country's reserves), oil, graphite, bentonite, marble and limestone. The region has 31 deposits of natural minerals, of which 19 are currently used (graphite, facing stone, limestone, and sand, necessary for the production of silicate, concrete and brick). The bulk of these concessions are in the following areas:

- in Alat district (gas and condensate - 293.8 billion m^3, technical salt - 100,000 tons),
- in Karaulbazar district (gas - 66,751 million m^3, condensate - 2,104,000 tons, oil - 9,119,000 tons),
- in Kagan district (crushed stone - 265,000 m^3),
- in Shafirkan district (crushed stone - 110,000 m^3).

Karakul district of Bukhara Region houses the Kandym Gas Processing Complex, one of the largest gas industry facilities in Central Asia. The Complex is a project of the Russian LUKOIL oil company with the total investment of 3.5 billion US dollars and has a capacity of 8.1 billion m^3 of gas per year. The launch of the Complex contributes to solving the problem set for the oil and gas industry by the government of the Republic of Uzbekistan in terms of in-depth processing of natural raw materials using modern advanced technologies.

Development of Scientific and Innovative Activities in the Region

Four higher educational institutions conduct research and innovative activities in the region. There are no research Institutes in Bukhara Region.

1. Bukhara State University

After Uzbekistan has gained its independence, Bukhara Pedagogical Institute was converted into Bukhara State University (1992). State support has helped to Bukhara State University to become one of the largest in Uzbekistan to train highly qualified specialists.

Rector	Obidjon Khafizovich Khamidov, D.Sc. in Economics
Vice-Rector for Research and Innovationss	Otabek Siddikovich Kakhkharov, PhD.
Number of students	7,626
Number of teaching professors	848
of them, academic degrees are held by	226 (37 D.Sc. + 189 Ph.D.)
Faculties	1. Pedagogy 2. Mathematics and Physics 3. Natural Sciences 4. Philology 5. Preschool and Primary Education 6. Art History 7. Physical Education 8. Economics and Tourism 9. Pre-Military Training

In 2020, under state scientific and technical programs within the framework of 3 fundamental, 2 practical projects, research work is carried out for a total of 813 million UZS.

Also, currently, in the context of the departments of the University, research activities are being carried out in the following areas:

- Creation of lime-thickening compositions based on local raw materials for the textile and consumer goods industry;
- Development of a technology for wastewater treatment in the textile industry based on chemical reagents;
- Biological wastewater treatment of industrial enterprises of Bukhara region;
- Enhancing soil fertility and improvement of ameliorative condition;
- Technology for obtaining highly permeable substances and their physical properties, magneto-optical properties of magnetic dielectric crystals;

- Properties of solvents distributed in nonlinear systems, the parameters of which are fluctuated;
- Issues of solar technology and ways to solve them;
- History of world migrations and history of Uzbek emigration;
- Opportunities and prospects for the development of regional tourism;
- Scientific basis for the creation of tourist free economic zones;
- Ways of tourism development in Uzbekistan and other areas;
- Theoretical and experimental problems of the stereochemistry of coordination compounds and in other areas.

The following projects were presented by professors and teachers of the University for a special competition of practical and innovative projects (round 26) (on the initiative of the Ministry of Innovative Development of the Republic of Uzbekistan) in order to attract the available research and innovative potential to provide scientific solutions to the problems of eliminating the consequences of a natural disaster caused by strong wind and rain in Bukhara region and due to breakthrough of the dam section on the Sardoba reservoir in Syrdarya region:

- project: *Studying the scientific basis of seed production of leguminous crops (soybeans and mung bean) and improving the productivity of the Karakul soil*s;
- project: *Development of methods and technological foundations for adaptation and resistance of cotton, wheat and other crops to environmental stressors (salinity, drought, high temperature and strong sultry winds) in saline soils and unfavorable climatic conditions of Alat and Karakul Districts*;
- project: *Creation of multimedia products on the subject "Family Psychology*".

Also, in October this year, research and innovative project *Creation of the Electronic Platform jadid.uz* and research project *Creation of practical and methodological support for teaching the Uzbek language as a foreign language* were submitted to the competition of scientific projects of the Ministry of Innovative Development of the Republic of Uzbekistan, held jointly with the Fund for the Development of the Uzbek Language under the Cabinet of Ministers of the Republic of Uzbekistan:

In order to realize the creative, educational and entrepreneurial potential of youth, introduce innovative ideas, projects and technologies into production, stimulate the innovative activities of scientists and entrepreneurs, create the necessary conditions for the integration of science, education and production, the University launched a business accelerator within the framework of cooperation between Bukhara state University and the Yoshlar Kelazhagimiz Foundation. On November 9, 2020, the official opening ceremony of the business accelerator was held at Bukhara State University.

Mutual cooperation of the parties covers the following areas:

- Organization of the activities of a business accelerator at Bukhara State University;
- Assistance in supporting and financing student start-up projects;
- Other projects in the field of education and vocational training.

The main goal of the mutual cooperation is the development of an entrepreneurial environment, start-up ecosystems, support for youth initiatives in Bukhara Region, creation of innovative tools and solutions for solving social problems of the region.

2. Bukhara State Medical Institute

Bukhara State Medical Institute named after Abu Ali ibn Sino was organized by the Decree of the Council of Ministers of the USSR dated August 24, 1990.

Rector	Prof. Shukhrat Jumaevich Teshaev, D.Sc. in Medicine
Vice-Rector for Research and Innovationss	Prof. Nekkadam Abdullaevich Nuraliev, D.Sc. in Medicine
Number of students	4,486
Number of teaching professors	427
of them, academic degrees are held by	85 (29 D.Sc. + 56 Ph.D.)
Faculties	1. General Medicine 2. Medical Pedagogy and Higher Nursing 3. Pediatrics, Medical Biology and Prevention 4. International Faculty 5. Advanced Training for Doctors

At the Institute, research activities are carried out in the following areas:

- Protection of health of mothers and children;
- Application of non-invasive methods in the diagnosis and treatment of dental and surgical diseases;
- Modern approach to early detection and prevention of noncommunicable diseases (therapy, neurology, gastroenterology, pulmonology);
- Study of genetic and immunological aspects of disease prevention and treatment;
- Modern aspects of morphological and experimental medicine.

Schools were formed in the areas of dentistry (A.Sh. Greys), medical morphology (prof. Teshaev), allergology, immunology (prof. N.A. Nuraliev) and obstetrics-gynecology (Prof. M. N. Negmatullaeva).

Currently, research activities are carried out by 2 doctoral students, 42 basic doctoral students and 139 independent researchers (17 DSc and 122 PhD).

A contract was signed with five private sectors, which provided all laboratory facilities for scientific research at Bukhara State Medical Institute.

These laboratories have created opportunities for carrying out the most modern methods of clinical, biochemical, immunological, PCR diagnostics.

Schools of dentistry, morphology, allergology and immunology, obstetrics and gynecology have been formed.

3. Bukhara Institute of Engineering and Technology

In 1977, on the basis of the Bukhara branch of the Tashkent Polytechnic Institute named after Abu Raikhon Beruni, the Bukhara Technological Institute of Food and Light Industry was established. The foundations for organizing and improving the educational process in the newly created institute were laid in 1980-1990. In 2012, the Bukhara Institute of Food and Light Industry Technologies was transferred to the Bukhara Institute of High Technology Engineering. The Bukhara Engineering Technological Institute was organized on the basis of the Decree of the President of the Republic of Uzbekistan dated April 15, 2013 No. PP-1954 "On the establishment of the Bukhara Engineering Technological Institute" on the basis of the Bukhara Institute of High Technologies.

Rector	Prof. Nustatilla Rajabaevich Barakaev, D.Sc. in Engineering
Vice-Rector for Research and Innovationss	Rauf Arifovich Khaitov, Ph.D. in Engineering
Number of students	8,387
Number of teaching professors	449
of them, academic degrees are held by	284 (25 D.Sc. + 159 Ph.D.)
Faculties	1. Chemical and Food Technology 2. Oil and Gas Technology 3. Consumers Goods Industry 4. Textile and Leather Industry 5. Mechanics, Architecture and Construction 6. Power Industry 7. Process Control Systems

Scientists of the Institute carried out research projects based on 5 state grants (2 practical, 2 fundamental and 1 innovative), 2 international grants for a total amount of 1,055.507 million UZS. In total, 13 professors and teachers, 36 doctoral students and independent researchers, 7 talented students are involved in these projects. In addition, funds received from research carried out on orders from the industry amounted to 617 million UZS.

The total number of published academic papers based on the results of research and innovation activities was 6095, including 65 monographs, 311 papers in international scientific journals, 204 papers in national scientific journals, 10 patents, and 19 authorship certificates. Published academic papers include works in prestigious foreign publications such as Open Science Publishing/Raleigh, LAP-Lambert Academic Publishing, as well as authoritative scientific and technical bases Scopus, Web of Science, ScienceDirect and others.

In the field of training research and research-pedagogical personnel, 13 doctoral students and basic doctoral students work, 4 doctoral students (DSc) and 36 basic doctoral students (PhD) were engaged in research work. The Institute hosted 1 international, 5 republican and 1 Institute scientific conferences.

Scientists and researchers of the Bukhara Institute of Engineering and Technology are conducting 50 research projects:

- Development of technology for the production of sedimentary chalk based on secondary raw materials;
- Wind energy equipment that works effectively at low wind speeds;
- Efficient multi-pole generator operating at low speed;
- System for increasing the reliability of power supply through a combination of alternative energy sources;
- Equipment for managing the reservation of electricity in a wind power plant;
- Development of an innovative technology for the production of high quality shoe bottom parts based on local industrial raw materials and waste;
- Development of the technology for cutting the saw teeth of the working part of the saw cylindrical device of technological machines for separating cotton seeds and grinning using laser beams;
- "Smart House";
- Seven Holy Pirs - Sacred Places;
- Creation of a new generation of functional nutritious vegetable-oil mixtures, etc.

4. Bukhara branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

Taking into account the increasing scale of tasks for land reclamation, as well as the specific features of the state of mineralization and salinity of agricultural land in individual regions and in order to train highly qualified specialists in this important area of the country's economy, in accordance with Resolution No. 182 of the Cabinet of Ministers of the Republic of Uzbekistan dated August 20, 2010, the Bukhara branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers was founded.

Director	Ravshan Kurbanmuratovich Mirusmanov
Deputy Director for Research and Innovation	Associate Prof. Fazliddin Urinovich Juraev
Number of students	2,698
Number of teaching professors	138
of them, academic degrees are held by	48 (5 D.Sc. + 43 Ph.D.)
Faculties	1. Automation and mechanization of water management 2. Hydromelioration

The branch prepares bachelors in three areas of education: *Water management and reclamation*, *Mechanization of Water Management and Reclamation Work* and *Land Management and Land Cadastre*. In the 2011-2012 academic year, training of specialists began in the field of operation of hydraulic structures and pumping stations, automation and control of technological processes and production, electric power. In subsequent years, training of young specialists was conducted in the field of vocational education (water

management and land reclamation), hydrotechnical construction, irrigation and drainage and mechanization of irrigation and drainage works.

The total number of students in 2019-2020 amounted to 2,698. The number of doctoral students was 11, masters - 97, gifted students - 128, of which 7 are holders of personal scholarships.

In the period 2017 to 2020, 7 teachers successfully defended their dissertations for the degree of D.Sc. in Philosophy (PhD) and 3 for the degree of D.Sc. in Science (DSc). In 2021, 5 teachers ate to defend their dissertations for the degree of D.Sc. in Philosophy (PhD) and 2 for the degree of D.Sc. in Science (DSc).

Three research schools successfully work at the Branch:

- Agricultural mechanization;
- Land reclamation and irrigated agriculture (technical sciences);
- Land reclamation and irrigated agriculture (agricultural sciences).

In addition, the “Land Management and Land Cadastre” research school began its activity. It is planned to create “Engineering Geometry and Computer Graphics” Research School.

The Branch has six scientific laboratories based on educational ones:

- a soil channel for testing agricultural machinery at the Technopark;
- installations for determining the parameters of irrigation networks on the basis of the laboratory of hydraulics;
- test laboratory for building materials;
- a pilot site for drip irrigation systems on the basis of the Uchkhoz Branch;
- laboratory for determining the composition and quality of the soil;
- installation of determination and regulation of parameters of electrical equipment and devices on the basis of a physics laboratory.

Thematic areas in which scientific research is carried out are presented as follows:

1. Development and justification of the parameters of mole-drainage devices.
2. Development and justification of the parameters of firing devices.
3. Development and justification of parameters of grading and leveling devices.
4. Plant for local fertilization between rows of cotton
5. Development of technologies and technical means for drip irrigation.
6. Development and implementation of water-saving technologies for intensive underground irrigation of Bukhara gardens.
7. Development of technologies for efficient use of collector waters.
8. Application of modern technologies for determining the land bonitet.
9. Geometric modeling of agricultural engineering systems.
10. Provision of design services to manufacturing enterprises based on geometric modeling.
11. Creation of a bureau for design and geometric modeling.
12. Creation of a device for the automation of electric lighting systems.

13. Development and improvement of the efficiency of a recirculating fruit dehydrator based on solar energy.
14. Introduction of equipment for electric field detection.

Within the framework of research work, in 2020, the professors and teachers of the branch published 647 academic papers, including:

- 32 in international scientific journals included in the Scopus and Web of Science databases;
- 122 in other international scientific journals;
- 170 in republican scientific journals;
- 227 in international conference proceedings;
- 74 abstracts in republican conference collections;
- 12 textbooks and teaching aids;
- 8 monographs;
- 2 patents.

The Branch has established fruitful cooperation with foreign universities. Close cooperation has been established with 14 foreign universities in the field of academic exchange and teaching, methodology and research. These include the State University of North Dakota and the University of Washington in the USA, Halle Vetenberg University in Germany, the State Agricultural University named after K.A. Timiryazev in the Russian Federation, University of Zagreb in Croatia, Gradinian Bordeaux in France: University of Agronomy and Agricultural Sciences AGROSUB Borde, Holon Institute of Technology in Israel.

To date, more than ten teachers have been trained in the Russian Federation, Belarus, Germany and Turkey, have taken part in scientific conferences. Under the cooperation agreement, since 2019, professors of the Kursk State Agricultural Academy of Russia and professors of the Belarusian State Agrarian Technical University have been systematically conducting online lectures. Cooperation has been established with the Nagoya University of Japan, Kazakh State University named after Mukhtor Avezov, and the Academy of Agriculture of Tajikistan.

KASHKADARYA REGION

Administrative center	Karshi
Administrative divisions	13 districts
KKhokim	Zoir Toirovich Mirzaev
Area	28 570 km² (ranked 4th)
Population	3 301 000 people (ranked 3rd)
Largest cities	Karshi, Chirakchi, Kamashi
GRP output	36 470.1 billion UZS (ranked 4th)
GRP structure	Agriculture, forestry and fisheries – 36.4% Industry – 31% Construction – 6.1% Trade and services sector – 26.5%
Key Indicators of the Development of the Scientific & Technological Potential and Innovations in Kashkadarya Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary education institutions	6
Number of institutions with a postgraduate education system	2
Number of doctoral/postdoctoral students	37
PhD/Ds applicants graduated	-
Number of institutions engaged in R&D	4
Size of R&D financing	2 829.4 million UZS
Number of employees engaged in R&D	164
Number of implemented technological innovations	125
Number of new technologies acquired by institutions	-

Background

Kashkadarya Region was formed on January 20, 1943 by a decree of the Presidium of the Supreme Soviet of the USSR. It included the cities of Karshi (the administrative center) and Shakhrisabz, as well as such districts as Guzar, Dekhkanabad, Kitab, etc., withdrawn from Bukhara Region.

In the period 1986 to 1989, Kashkadarya Region was headed by First President of the Republic of Uzbekistan Islam Karimov.

This land raised such heroes as Spitamen, who impressed Alexander the Great with his heroism in 329 BCE, the great Amir Temur, who founded the great and mighty empire of the Temurids.

There are 997 historical monuments in the region. The city of Shakhrisabz is included in the UNESCO World Cultural Heritage List. In 2006, also on the initiative of the International Organization of UNESCO, the city of Karshi celebrated its 2700th anniversary.

Region's Economy

Karshi, tthe administrative center of Kashkadarya Region, has railway lines connecting Termez, Samarkand and Navoi. The total length of railways is 494.4 km.

The main sectors of the economy of Kashkadarya Region are the fuel and energy, light, food, flour and cereal industries, as well as the production of building materials.

The region has large deposits of natural resources. The region ranks 1st in the country for the extraction of hydrocarbons (oil, gas, condensate) and the processing of natural gas. There are 14 joint ventures with foreign investors.

Of these, the largest industrial enterprises:

- Uzgeoburneftgaz JSC;
- Mubarekneftegaz USE;
- Shurtanneftegaz USE;
- Shurtan Gas Chemical Complex USE;
- Mubarek Gas Processing Plant;
- Dehkanabad Potash Fertilizer Plant;
- Talimarjan State District Power Plant.

In 2017, PJSC LUKOIL successfully launched major production and processing facilities in the framework of the main stage of the project South-West Gissar in Uzbekistan. Among the facilities commissioned, there are a gas treatment unit with a nominal capacity of 4.4 billion m^3 per year, a preliminary gas processing plant, as well as four gas-gathering stations.

As a result of the launch of these facilities, gas production at the Gissar group of fields has been brought to the design level, which is about 14 million cubic meters per day, or 5 billion cubic meters per year. Today, the operating well stock of the fields is 37 production wells.

As part of the Project, 300 km of high-voltage power transmission lines, two power substations, 126 km of access roads were also built. At the project facilities, 64 thousand cubic meters of concrete were laid, about 12 thousand tons of metal structures and more than 4 thousand tons of equipment were installed, 286 km of linear pipelines were built.

The main branches of agriculture are cotton growing, fur farming, horticulture, viticulture, meat and dairy cattle breeding, sheep breeding, sericulture.

Development of Scientific and Innovative Activities in the Region

Six higher educational institutions conduct research and innovative activities in the Region. There are no research Institutes in Kashkadarya Region.

1. Karshi State University

Karshi State University was founded by Resolution No. 125 of the Cabinet of Ministers of the Republic of Uzbekistan dated March 11, 1992 for the implementation of the Decree of the President of the Republic of Uzbekistan *On the Establishment of New Universities* dated February 28, 1992. During this period, more than 70 thousand people were trained in the University, including about 30 thousand qualified personnel in various branches of science.

Rector	Bakhodir Allaberdievich Shoimkulov, D.Sc. in Physics and Mathematics.
Vice-Rector for Research and Innovationss	Associate Prof. Nodir Sultanovich Kholmirzaev, Ph.D. in Engineering
Number of students	12,200
Number of teaching professors	634
of them, academic degrees are held by	197 (22 D.Sc. + 175 Ph.D.)
Faculties	1. Mathematics and Physics 2. Natural Sciences 3. Art History 4. Pedagogy 5. Physical Education 6. Philology 7. Social Sciences 8. Foreign Languages

In 2020, 24 candidate (PhD) and 1 doctoral (DSc) dissertations were successfully defended at Karshi State University.

Currently, more than 12,000 students study at Karshi State University in 39 areas of undergraduate studies (including on a full-time basis - 8442, on an extramural basis - 3,572), and 189 undergraduates are trained in 19 specialties.

To conduct the educational process in accordance with the requirements of the State Standard, 17 educational laboratories, 6 language classes, workshops, and experimental production sites have been created.

The general book stock of the Information Resource Center of the University is 323 666 units. Of these, 70,364 are textbooks and 74,115 are learning aids. In 2018, the stock was replenished with 4 675 new books.

Research activities at the University are carried out in the following areas:

1. Stochastic analysis and theory of stochastic processes;
2. Ways to preserve and increase soil fertility in Kashkadarya Region;
3. Problems of enrichment of cultural flora with introduced species in extra-arid conditions;

4. Study of the dendroflora of the Gissar Ridge, its possibilities in the creation of new varieties of plants;
5. Issues of nature management in Southern Uzbekistan;
6. Healthy lifestyle, issues of its promotion and implementation among the population;
7. Methodological foundations for increasing the effectiveness of training on the basis of IT-technologies;
8. Energy saving when using non-traditional and renewable energy sources;
9. Creation of biologically active preparations for use in agriculture;
10. Research of actual problems of preschool education;
11. Phytopathological study of cultivated plants of the flora of Southern Uzbekistan;
12. Topical issues of literary criticism, literary ties and intercultural relations;
13. Theoretical and practical issues of Uzbek linguistics;
14. History and urban culture of Southern Uzbekistan;
15. Study of the structure of gases and liquids based on molecular spectroscopy;
16. Dynamical systems with continuous and discrete time.

Currently, Karshi State University is implementing 1 fundamental, 2 applied, 8 start-up projects, as well as two projects of the Academic Innovation Fund of the Ministry of Higher and Secondary Specialized Education with the support of the World Bank and the International Development Association:

1. *Strengthening the Ties of Karshi State University with Industrial Enterprises of Kashkadarya Region and Improving the Quality of Student Education* in the amount of 130,000 US dollars.
2. *New Technologies in the Organization of the Educational Process in Higher Educational Institutions of Uzbekistan* in the amount of 140,000 US dollars.

In the period 2019 to 2020, 4,840 academic papers were published by professors, teachers, and research workers, including:

- 47 papers in scientific journals included in the Scopus, Web of Science databases;
- 453 papers in other foreign scientific journals;
- 442 papers in republican scientific journals, reviewed by the Higher Attestation Commission;
- 342 papers in other republican scientific journals;
- 315 abstracts in collections and proceedings of international conferences;
- 2,978 abstracts in collections and proceedings of national conferences;
- 263 monographs, teaching aids, textbooks, textbook of methods.

Within the framework of research activities, 1 patent for an invention and 17 authorship certificates were obtained.

2. Karshi Engineering and Economic Institute

The educational institution was first established in 1975 and called the Karshi branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers. In accordance with Decree No. 356 of the President of the Republic of Uzbekistan dated February 28, 1992, on its basis, Karshi Agrarian and Economic Institute was established. By Resolution No. 211 of the Cabinet of Ministers of the Republic of Uzbekistan dated June 3, 1995, the Karshi Agrarian and Economic Institute was converted into Karshi Engineering and Economic Institute.

Rector	Orifjan Shadievich Bazarov, D.Sc. in Engineering
Vice-Rector for Research and Innovationss	Otabek Nashvandovich Bozorov
Number of students	9,965
Number of teaching professors	570
of them, academic degrees are held by	142 (20 D.Sc. + 122 Ph.D.)
Faculties	1. Oil and Gas 2. Engineering and Technology 3. Economics 4. Power Industry 5. Industrial Technology 6. Vocational Education

As of November 10, 2020, 13 Ph.D. and 3 D.Sc. dissertations were defended by researchers of the Institute.

Researchers and scientists of the Institute annually implement research and innovative projects under state scientific and technical research programs, created on the basis of a government order.

In 2020, the following were implemented:

- 3 fundamental projects for the amount of 323,800,000 UZS;
- 3 applied projects for the amount of 523,300,000 UZS;
- 3 international projects in the amount of 24,920 euros;
- 7 start-up projects for the amount of 520,000,000 UZS.

Within the framework of the implemented projects, 35 economic contracts were signed amounting to 608 million UZS, 5 patents were received.

In 2020, professors and teachers of the Institute published 1,217 academic papers, of which:

- 384 papers in international scientific journals;
- 231 papers in republican scientific journals;
- 84 abstracts in international conference collections and proceedings;
- 462 abstracts in republican conference collections and proceedings;
- 22 textbooks and teaching aids;
- 34 monographs.

3. Karshi branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

On December 13-14, 2018, the President of the Republic of Uzbekistan visited Kashkadarya Region. Taking into consideration the high demand for highly qualified engineers and technicians in the field of agriculture and water management in the southern regions of the country, especially in Kashkadarya Region, he proposed to open a branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers in Karshi. In accordance with Resolution No. 437 of the Cabinet of Ministers dated May 28, 2019, the Karshi branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers was established.

Director	Associate Prof. Zarif Majlisovich Mukimov, Ph.D. in Economics
Vice-Director for Research and Innovations	Associate Prof. Khamrokul Amirkulovich Ravshanov, D.Sc. in Engineering
Number of students	254
Number of teaching professors	63
of them, academic degrees are held by	8 (6 D.Sc. + 2 Ph.D.)
Faculties	1. Agricultural mechanization 2. Water management and land reclamation 3. Hydraulic facilities and pumping stations 4. Land Cadaster and Land Utilization 5. Automation and control of technological processes and production 6. Geodesy and Geoinformatics

In 2019, 2 dissertations of D.Sc. in Philosophy (PhD) were successfully defended. One teaching professor was given an associate professor rank. In 2020, 2 dissertations of D.Sc. in Technical Sciences (DSc) were successfully defended.

16 professors and lecturers conduct research under PhD' degree program as an independent researcher. The subjects of their research were approved by the Branch Council in 2019-2020 and published in the Republican Bulletin of the Higher Attestation Commission.

In the period 2019 to 2020, professors and teachers of the Branch published:

- 5 papers in foreign scientific journals included in the Scopus databases;
- 18 papers in other foreign scientific journals;
- 25 papers in republican scientific journals and those recognized by the Higher Attestation Commission;
- 63 abstracts in the proceedings and collections of foreign and national conferences;
- 5 monographs.

Within the framework of ongoing research activities in the period 2019 to 2020, 13 foreign and domestic patents and 1 authorship certificate were obtained.

The main directions of the development of research activities of the Branch are:

1. Development of scientific and practical solutions for resource-saving technologies and technical means for agriculture.
2. Development of water management problems and their scientific and practical solutions.
3. Development of electrical technologies and electrical equipment for protection of agricultural seeds from diseases.

A "problem base" was formed to solve the issues of the leading state-owned enterprises of Kashkadarya Region: Amu-Kashkadarya Basin Directorate of Irrigation Systems, Department of Pumping Stations and Power Industry, Kashkadarya Regional Branch "Kashvilerloyiha" of the State Uzdaverloyikha Research and Design Institute, Kashkadarya Center for Testing and Certification. Research work is carried out jointly with the All-Russian Research Institute of Hydraulic Engineering and Melioration named after A.N. Kostyakov, the Tashkent Scientific Research Institute for Agricultural Mechanization, the Scientific Research Institute for Water Problems and the Scientific Research Institute for Plant Protection.

Professors and teachers of the Branch signed an economic agreement amounting 146.5 million UZS related to the Project *Study of the Effect of Sulfur Bentonite and Sulfuric Acid Fertilizers on the Main and Secondary Crops and Soil Composition*.

On November 12, 2020, at the Ministry of Innovative Development of the Republic of Uzbekistan, together with the Karshi Institute of Engineering and Economics, a presentation of the Project *Implementation of R&D work to prepare for commercialization of a tractor equipment set designed for 40 hp was with a one-way plow (a plow for flat plowing, a softening plow and a chisel cultivator*) amounting to 500 million UZS was defended.

Currently, professors and teachers of the Branch have submitted applications for 5 research projects totaling 2.17 billion UZS.

4. Karshi branch of Tashkent University of Information Technologies

The Karshi branch of the Tashkent University of Information Technologies named after Muhammad al-Khorezmi was established on the basis of Resolution № PP-91 of the President of the Republic of Uzbekistan *On Improving the Training System in the Field of Information Technology* dated June 2, 2005.

Director	Associate Prof. Adilbek Mukhtorovich Turgunov, Ph.D. in Engineering
Deputy Director for Research and Innovation	Sherbek Bakhtiyorovich Normatov, PhD
Number of students	1,755
Number of teaching professors	81
of them, academic degrees are held by	19 (17 D.Sc. + 2 Ph.D.)

Faculties	1. Computer Engineering

The branch cooperates with 5 foreign higher educational institutions:

- University of Sannio (Italy);
- Belarusian State University of Informatics and Radioelectronics;
- Belarusian State Technological University;
- Mogilev State Institute of Education Development;
- National University of the Republic of Tajikistan.

In total, 3 projects were implemented within the framework of the European Union Erasmus+ program.

In particular:

In the period 2015 to 2019, the Branch successfully implemented the project *TECHREH - Information Technologies in Medicine* (the value is 744.200 EURO) under the Erasmus+ program of the European Union;

In the period 2019 to 2022, the project *SPACESOM: A New Curriculum on Space Systems and Communications Engineering* is being implemented (the value is 998,997 EURO);

A project is being implemented to support student mobility for the years 2020 to 2023 with the participation of the University of Sannio (Italy). The project provides an opportunity for 12 young researchers and students to work in the scientific laboratories of the University of Sannio.

In addition, the Branch is implementing 25 economic contracts totaling 87 million UZS.

Within the framework of research activities in 2020, the professors and teachers of the branch published 58 papers in international Scopus, Web of Science and other scientific journals.

Currently, the branch has 3 scientific laboratories and 12 project teams, and more than 20 professors, teachers and researchers, 62 students conduct their own research.

Students completed 35 projects in 2019, 42 start-up projects in 2020, as well as software and practical developments.

In accordance with Decree No. PU-6079 of the President of the Republic of Uzbekistan, the Branch organized advanced training courses on digital technologies for 154 employees of regional organizations.

5. Shakhrisabz branch of the Tashkent State Pedagogical University named after Nizami

On the basis of Resolution No. 488 of the Cabinet of Ministers of the Republic of Uzbekistan dated June 11, 2019, a branch of the Tashkent State Pedagogical University named after Nizami was established in the city of Shakhrisabz, the Charter and Activity Plans of the Branch were adopted and approved by the decision of the 1st Council on September 4, 2019.

KASHKADARYA REGION

Director	Abdukakhkhor Gadoevich Ganiev
Deputy Director for Research and Innovation	Umida Norkozievna Marasulova
Number of students	1,125
Number of teaching professors	56
of them, academic degrees are held by	9 Ph.D.
Faculty	1. Pedagogy

In order to perform research and innovative activities, there are the Department of International Cooperation, the Sector of Scientific Research, Innovation and Training of Scientific and Pedagogical Personnel, Sector for Organizing Research Activities of Gifted Students, Information and Technical Center.

In accordance with Resolution No. PP-3698 of the President of the Republic of Uzbekistan *On Additional Measures to Improve the Mechanisms for Introducing Innovations in the Industry and the Economy* dated May 7, 2017, the Charter of the Commercialization Department of Scientific and Innovative Developments was developed and approved (Order No. 190-U of the Branch dated November 14, 2019, No. 195-MX dated December 27, 2019).

To conclude mutually beneficial contracts with industrial enterprises cooperating with the Branch, to revise the concluded contracts, an innovation group was formed, and a leader was appointed. To implement research and innovative projects in the Shakhrisabz branch of the Tashkent State Pedagogical University, two innovative groups were created in the departments.

The Branch has established innovative cooperation with 3 enterprises and educational institutions, developed cooperation plans. An action plan was developed for the established group of innovative cooperation, which substantiates the implementation of these activities and the expected results. The content and essence of the concluded agreements are clarified. The topics of scientific and technical problems of the enterprise, educational institutions, the essence of the problem, the required solution and the expected results of solving these problems are formed.

In order to solve the problems of enterprises, organizations and educational institutions of Kashkadarya Region, two applied projects have been prepared.

In the current year, the branch does not conduct research work on state scientific and technical programs.

During the 2019-2020 academic year, the Branch fulfilled economic contracts amounting 22 million UZS at the expense of support of preparatory training courses in the specialties Biology, Mother Tongue and Literature. By the end of the year, this figure will increase to 25 million UZS.

In the 2019-2020 academic year, the number of academic papers in the field of scientific research was:

- 40 papers in foreign scientific journals included in the Scopus and Web of Scince databases;
- 24 papers in republican scientific journals recommended by the Higher Attestation Commission;
- 31 abstracts in the proceedings and collections of international conferences;
- 80 abstracts in the proceedings and collections of national conferences;
- 2 teaching aids;
- 1 monograph;

- 6 textbook of methods.

One software product was presented at the exhibition of the International Week of Innovative Ideas InnoWeek.Uz, held in Uzbekistan on November 3-8, 2020.

Cooperation was established with foreign educational institutions such as Panjikent State University (Tajikistan) and Volgograd State Social and Pedagogical University (Russia).

Within the framework of Erasmus+, an online seminar was organized with one of the program coordinators Sherzod Gulyamov. A list of 4 candidates from professors and teachers of the Branch was sent for internship and advanced training abroad.

It is planned that 10 professors and teachers under the age of 45 will participate in competitions of the El-Yurt Umidi Foundation in order to improve their qualifications, undergo internships, and improve the knowledge of Russian and English languages.

In pursuance of Order No. 781 of the Ministry of Higher and Secondary Specialized Education dated August 29, 2019 and clause 5 of the *Plan of targeted measures to strengthen the selection of future scientists among students of higher educational institutions* approved by the Deputy Prime Minister of the Republic of Uzbekistan, an indicator for the selection of gifted students from the first year was developed in the Shakhrisabz branch of the Tashkent State Pedagogical University named after Nizami.

6. Shakhrisabz branch of the Tashkent Chemical-Technological Institute

On the initiative of President of the Republic of Uzbekistan Sh.M. Mirziyoyev, based on Resolution No. 489 of the Cabinet of Ministers of the Republic of Uzbekistan dated June 11, 2019, a branch of the Tashkent Chemical-Technological Institute was established in the city of Shakhrisabz.

Director	Shukhrat Akhmadjonovich Mutalov
Deputy Director for Research and Innovation	Suvankul Saparovich Ravshanov
Number of students	1,160
Number of teaching professors	50
of them, academic degrees are held by	10 (8 D.Sc. + 2 Ph.D.)
Faculties	1. Food technology and industrial viticulture

In the Shakhrisabz branch of the Tashkent Chemical-Technological Institute, workshops of low capacity (0.3-1.0 tons/day) have been designed for processing milk, fruits and vegetables, dehydrating, packaging, making bread, pasta and flour confectionery goods. The workshops are intended for training the unemployed youth in entrepreneurship and the study of the functional properties of local raw materials.

The Tashkent Chemical-Technological Institute and its Shakhrisabz Branch are jointly implementing an applied project No. PZ-20170930257 *Improvement of Hydrothermal Treatment in the Technology of Grinding Flour from Local Wheat Grains* for the years 2018 to 2020.

The Branch actively participates in all grant projects announced by the Ministry of Innovative Development within the framework of state research and technical programs.

In particular, the Branch took part in the competition for innovative developments designed for 2020-2023 with applied projects on the topic *Development of technology for improving the functional properties of wheat flour without food additives* and *Research on the influence of groundwater and drinking water on the preparation of local wheat grains to obtain flour*.

In the 2019-2020 academic year, the Shakhrisabz Branch of the Tashkent Chemical-Technological Institute published more than 50 academic papers, including:

- 3 papers in foreign journals included in the Scopus database;
- 14 papers in other foreign journals;
- 2 textbooks;
- 1 monograph;
- 3 teaching aids.

Also, a study carried out by researchers of the Tashkent Chemical-Technological Institute and young scientists of the Shakhrisabz Branch resulted in registration with the Intellectual Property Agency 7 applications for a patent for an invention aimed at improving the preparation of soft wheat grain grown in an arid climate for graded milling, increasing the baking properties of ground varieties of flour and improving their technological properties in the production of bakery products with no additives.

KHOREZM REGION

Administrative center	Urgench
Administrative divisions	10 districts
KKhokim	Farkhod Urazbaevich Ermanov
Area	6 300 km² (ranked 11th)
Population	1 876 600 people (ranked 10th)
Largest cities	Urgench, Khazorasp, Khonka
GRP output	19 136.5 billion UZS (ranked 10th)
GRP structure	Agriculture, forestry and fisheries – 47.7% Industry – 14.8% Construction – 6.4% Trade and services sector – 31.1%
Key Indicators of the Development of the Scientific & Technological Potential and Innovations in Khorezm Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary education institutions	3
Number of institutions with a postgraduate education system	2
Number of doctoral/postdoctoral students	85
PhD/Ds applicants graduated	10/7
Number of institutions engaged in R&D	7
Size of R&D financing	4 352.9 million UZS
Number of employees engaged in R&D	128
Number of implemented technological innovations	36
Number of new technologies acquired by institutions	-

Background

The Khorezm People's Soviet Republic was created as the successor to the Khiva Khanate in February 1920. In 1925 to 1930 and 1932 to 1938, it was Khorezm district, and on January 15, 1938, it was converted in a separate region.

In the 8th century BCE, on the modern territory of the region, the Khorasmis founded one of the most ancient states in Central Asia. The tribes of Massagets, Sakas, Apasaks, Oses, Dakhs, etc. also lived here.

In the 11th century, Urgench, the capital of Khorezm, was a well-maintained city with high culture. Khorezmshah Abul Abbas ibn Ma'mun, being a ruler with a keen interest in culture and science, strongly supported scholars, poets, musicians, calligraphers, architects and artists. At the court of the Khorezmshahs in Urgench there were such great thinkers of the East as the physician Ibn Sina (Avicenna) and the scientist Abu Raikhan Beruni, the historian Ibn Miskawayh, the mathematician Abu Nasr ibn Iraq, the philosopher Abu Sahl Masihi, the healer Ibn Khammar, and others. The first scientific academy in the Muslim East – "Baytan-Hikama" - was headed by the outstanding mathematician al-Khwarizmi (783-850), who took part in

measuring the length of a degree of the terrestial meridian arc; he wrote works on the design of an astrolabe, academic work K*itab al-jabr wa-l-Mukabala*, one of the first in the world *Astronomical Tables*, and a number of scientific treatises. He was the first to solve a number of algebraic equations, to introduce a new sign – "Zero" - into the numerical series, which expanded the theory of numbers and made it possible to use negative numbers.

In the 12th century, the Khorezmshahs State was formed.

In 2003, Khorezm Region was awarded the Order of Jaloliddin Manguberdi.

Region's Economy

Khorezm Region is crossed by railway lines connecting Navoi Region and the Republic of Karakalpakstan, with a length of more than 130 km within the Region. There is air service with a number of cities in Central Asia, Russia, the CIS and other countries. There are regular flights to Tashkent, Moscow, St. Petersburg, Paris, Rome, Milan, as well as charter flights for tourists.

An intercity trolleybus operates between the administrative center of the region and the city of Khiva.

Khorezm Region is one of the agro-industrial regions of Uzbekistan. Agriculture plays an important role in its economy.

In it, the role and importance of farming enterprises, the number of which after the consolidation reform exceeded 5000, are increasing day by day. Farmers deliver about 98% of raw cotton and 65% of grain grown in Khorezm.

Local industry is mainly related to the processing of agricultural products. There are also factories for the production of carpets, building materials and food products.

In Urgench, there are factories (engaged in manufacture of forage harvesters, cotton ginning, oil extraction, excavator repairing and tire repairing), silk-winding and garment factories, there are facilities for manufacture of building materials.

The tourism sector is developing, in which a special place is occupied by services provided to foreign tourists.

Development of Scientific and Innovative Activities in the Region

Research and innovative activities in the region are carried out by three higher educational institutions and one research Institute.

1. Urgench State University

Urgench State University is one of the oldest universities in Uzbekistan and Central Asia, the third largest university in Uzbekistan, was founded by Decree No. 356 of the President of the Republic of Uzbekistan dated February 28, 1992 on the basis of the former Khorezm State Pedagogical Institute.

Rector	Associate Prof. Bakhrom Ismailovich Abdullaev, D.Sc. in Physics and Mathematics
Vice-Rector for Research and Innovationss	Zafar Shavkatovich Ibragimov, PhD
Number of students	19,113
Number of teaching professors	760
of them, academic degrees are held by	217 (27 D.Sc. + 190 Ph.D.)
Faculties	1. Physics and mathematics 2. Foreign Language Philology 3. Philology 4. Natural sciences 5. Pedagogy 6. Physical Education 7. History 8. Tourism and economics 9. Engineering 10. Chemical technology 11. Art 12. Bioengineering and food security

Under the European Union ERASMUS+ program for capacity building in higher education, the following projects have been implemented in recent years:

- Master's program in the creation of computer (computing) centers and curriculum development in mathematical design - ECCUM;
- Creation of the Master's Program in Renewable Energy and Sustainable Environment - RENES;
- Creation of educational programs in the specialty of building eco-houses (Green-Building) - GREB;
- Development of a Master's Program in Computational Linguistics at Universities of Central Asia - CLASS;

- Environmental Protection in Central Asia: Disaster Risk Management with Spatial Techniques - EPCA;
- Creation of training and research centers and the development of courses on the mining of big data in Central Asia - ELBA.

Within the framework of the projects of International Credit Mobility of the ERASMUS program, agreements have been signed with the following foreign universities:

- University of Porto, Portugal;
- University of L'Aquila, Italy;
- University of Padua, Italy;
- University of Applied Sciences Weinstephan Triesdorf, Germany;
- Keele University, UK;
- University of Cantabria, Spain;
- University of Cluj Napoca of Agricultural Sciences and Veterinary Medicine, Romania.

At present, Urgench State University participates in foreign projects in conjunction with reputable foreign universities. The University is implementing several projects in collaboration with universities and research centers in the United States and Germany.

IRES Project of the US National Science Foundation. The main goal of this project is to give American and Uzbek students the opportunity to exchange experiences with mathematics professors in Uzbekistan during their summer vacations. Within the framework of the project, for 3 years, American students have been visiting Uzbekistan during their summer vacations, conducting research with mathematicians of Uzbekistan, visiting the cities of Tashkent, Samarkand, Bukhara and Khiva, and also getting acquainted with the history and culture of Uzbekistan. They will also participate in the Uzbek language courses. In addition, during the project, they will visit the National University of Uzbekistan and Urgench State University, meet students and visit Khorezm Mamun Academy. The main goal of this project is to demonstrate the great contribution of Uzbekistan to the rich world history, culture and science, along with the further development of scientific cooperation between the two countries.

Urgench State University is successfully implementing the US Department of State project S-UZ800-16-GR-061 *English for Science, Technology, Engineering and Mathematics (English for STEM)*. Within the framework of the project, students in the field of technology, mathematics and engineering will be offered courses on the use of English in the study of topical problems of science. Classes are given by professional teachers of the Department of English Language and Literature.

Project SUMRICA Volkswagen Foundation (Germany) is designed for three years in collaboration with universities in Germany and Central Asia (CA). The main activities are summer schools, thematic and administrative seminars, research trips and publications, which are conducted on three main themes: (1) land use and transport - integrated transport planning; (2) green mobility, (3) transport policy and financial issues. The project is funded by the Volkswagen Foundation in Germany.

2. Khorezm branch of Tashkent University of Information Technologies

The Urgench branch of the Tashkent University of Information Technologies named after Al-Khorezmi was formed on the basis of Resolution No. PP-91 of the President of the Republic of Uzbekistan *On Improving the Education System in the Field of Information Technology* dated June 2, 2005 and Order No. 130 of the Ministry of Higher and Secondary Specialized Education of the Republic of Uzbekistan " *On Approval of the Model Regulations on Branches of Higher Education Institutions* dated June 14, 2005.

Director	Maksudbek Islamjanovich Bayjanov, Ph.D. in Physics and Mathematics
Deputy Director for Research and Innovation	Shukrullokh Khabibullaevich Ismoilov, Ph.D. in Physics and Mathematics
Number of students	1,541
Number of teaching professors	78
of them, academic degrees are held by	21 (1 D.Sc. + 20 Ph.D.)
Faculties	1. Computer engineering 2. Telecommunication technologies 3. Uzbek-Belarusian Joint Information Technologies

The branch has 3 faculties and 8 departments. More than 1,500 students and 28 undergraduates study in 8 specialties.

In the Branch, research activities are carried out in the following areas:

1. Creation of technical, informational, algorithmic and software products of an intelligent integrated hierarchical management system for organizational and technological processes of an enterprise;
2. Methods and algorithms for planning production processes and operational dispatch control in the flour-grinding industry;
3. Information technologies in education, the formation of educational and methodological support of an integrated education system;
4. Modeling of natural processes;
5. Topical issues of higher mathematics;
6. The role of the humanities in the education of a harmoniously developed generation;
7. Management and modeling of processes in the field of telecommunications and transport;
8. Intelligent analysis of large amounts of data.

At present, a fundamental project named *Studying the Formation of Secondary Radiation Defects in Silicon and a Solid Solution of Silicon-Germanium* (BF-4-016) is being implemented.

In the period 2019 to 2020, as part of the implemented projects, 6 economic contracts were signed amounting to 596 million UZS, 10 authorship certificates were obtained.

In 2020, professors and teachers of the Branch published a total of 290 academic papers, of which:

- 25 papers in scientific journals included in the Scopus, Web of Science databases;
- 17 papers in other scientific foreign journals;
- 27 papers in republican scientific journals recommended by the Higher Attestation Commission;
- 58 papers in other republican scientific journals;
- 43 abstracts in collections and proceedings of international conferences;
- 112 abstracts in collections and proceedings of national conferences;
- 8 monographs, teaching aids, textbooks, textbook of methods.

3. Urgench branch of the Tashkent Medical Academy

In accordance with Resolution No. 125 of the Cabinet of Ministers of the Republic of Uzbekistan dated March 11, 1992 and Order No. 171 of the Ministry of Health of the Republic of Uzbekistan dated March 20, 1992, the Urgench branch of the Tashkent Medical Academy was established to improve the qualifications of medical personnel in the region.

Director	Rashid Yusupovich Ruzibaev, D.Sc. in Medicine
Deputy Director for Research and Innovation	Prof. Ravshanbek Babajanovich Abdullaev, D.Sc. in Medicine
Number of students	2.200
Number of teaching professors	250
of them, academic degrees are held by	74 (11 D.Sc. + 63 Ph.D.)
Faculties	1. General Medicine 2. Pediatrics 3. Disease Prevention, Healthcare Management

Currently, 2,200 students, 30 undergraduates in 9 areas of specialties are trained in the Branch.

Specialized Council PhD 04/30.09.2020.Tib.123.01. in specialty 14.00.05-Internal medicine.

The branch has 14 employees studying under doctoral degree programs (PhD), and 84 employees conduct research as independent applicants. In 2020, 12 young researchers defended their PhD theses. The results of their research are being introduced into the educational process and practice of medical institutions.

In 2018, the Fund for the Commercialization of Innovative Developments was created in the Branch. 50 million UZS were transferred to the Fund. Nine professors and teachers presented their innovative projects.

Two start-up projects are now being implemented. In 2020, 8 applications were submitted for participation in state grant programs on the prevalence, features of the course, prevention, diagnosis and treatment of patients in the adverse environmental conditions of the Southern Aral Sea region (Khorezm region).

In addition, in 2019-2020, the Urgench branch of the Tashkent Medical Academy signed 6 agreements with foreign tertiary educational institutions on in the field of science and education.

As part of the implemented projects in 2019-2020, 1 economic agreement was signed amounting to 149.3 million UZS, 2 patents for inventions were obtained.

In 2020, professors and teachers of the Academy published 881 academic papers, of which:

- 63 papers in scientific journals included in the Scopus, Web of Science databases;
- 71 papers in other foreign scientific journals;
- 85 papers in republican scientific journals recommended by the Higher Attestation Commission;
- 58 papers in other republican scientific journals;
- 62 abstracts in collections and proceedings of international conferences;
- 810 abstracts in collections and proceedings of national conferences;
- 71 monographs, teaching aids, textbooks, textbook of methods.

4. Khorezm Mamun Academy

By Decree No. 1880 of the President of the Republic of Uzbekistan dated November 11, 1997, the Khorezm Mamun Academy was revived. The activities of the Academy are aimed at increasing the scientific potential of Uzbekistan, strengthening its role in the world scientific community, further developing science in the regions. It is an important step in supporting devoted scientists and developing national traditions of creating a high intellectual environment.

Chairman	Prof. Ikram Iskandarovich Abdullaev, D.Sc. In Biology
Deputy Chairman for Research and Innovation	Shodlik Bekpulatovich Khasanov, Ph.D. in Chemistry
Number of doctoral students	27
Number of teaching professors	37
of them, academic degrees are held by	14 (3 D.Sc. + 11 Ph.D.)

In 2020, 6 candidate (PhD) theses were defended.

The academy has such departments as:

1. Department of Natural Sciences;
2. STEM Department;
3. Department of Social Sciences and Humanities;
4. Laboratory for preventing the spread of termites and combating them;
5. Laboratory Testing and restoration of building materials for historical architectural monuments of the South Aral Sea region.

Currently, the research activities of the Academy are carried out in the following areas:

1. Study in a continuous sequence of the ancient history of Khorezm, its unique civilization and culture, research into the role of its rich scientific potential in the development of world science and culture;

2. Conducting permanent archaeological expeditions to study archaeological sites located in Khorezm, systematic organization of ethnological research and source study, as well as widespread promotion of the results obtained to the scientific community;
3. Development and implementation into practice of scientific foundations for the protection of architectural monuments of Khorezm from various negative factors;
4. Conducting continuous scientific monitoring of the ecological state of the Khorezm oasis, effective use of land, water and biological resources, studying the issues of preventing salinization and desertification by acclimatizing agricultural crops suitable for the soil and climatic conditions of the Khorezm oasis, developing innovative techniques in the field of agriculture and fish farming based on the existing experimental base;
5. Conducting fundamental scientific research in the field of mathematics, taking into account the historical traditions of Khorezm and using the existing research potential;
6. Creation and widespread introduction into production of scientific foundations for processing local resources.

In the period 2019 to 2020, 2 fundamental and 3 applied projects were implemented at the Khorezm Mamun Academy. In 2020, 6 applications were submitted for participation in state and international grant programs.

Within the framework of ongoing research projects, 204 academic papers were published, of which:

- 21 papers in scientific journals included in the Scopus, Web of Science databases;
- 23 papers in other foreign scientific journals;
- 26 papers in republican scientific journals recommended by the Higher Attestation Commission;
- 24 papers in other republican scientific journals;
- 35 abstracts in collections and proceedings of international conferences;
- 66 abstracts in collections and proceedings of national conferences;
- 9 monographs, teaching aids, textbooks, textbook of methods

In the period 2019 to 2020, as part of research activities, economic contracts were concluded in the amount of 800 million UZS. for the sale of seed of the new variety of cotton *Niyat* to HAZORASP TEXTILE Agriculture Cluster, as well as to prevent the spread of termites in the State Museum-Reserve Ichan Kala. In addition, two patents were obtained for new varieties of cotton *Khurma* and *Niyat* (No. NAP 20170013, No. NAP 2016001). Today, these varieties, in accordance with Resolution No. PP-3855 of the President of the Republic of Uzbekistan *On Additional Measures to Improve the Efficiency of Commercialization of the Results of Research and Scientific and Technological Activities* dated July 14, 2018 are included in the list of commercialization.

The scientists of the Academy have established relations with a number of foreign research Institutes and centers, universities and are actively conducting scientific research in cooperation with them.

SURKHANDARYA REGION

Administrative centre	Termez
Administrative divisions	14 districts
KKhokim	Tura Abdiyevich Bobolov
Area	20 800 km² (ranked 5th)
Population	2 652 900 people (ranked 7th)
Largest cities	Denau, Kumkurgan, Jakurgan
GRP output	22,349.3 billion UZS (ranked 9)
GRP structure	Agriculture, forestry and fisheries – 50.9% Industry – 7.9% Construction – 8.1% Trade and services structure– 33%
Key Indicators of Development of the Scientific & Technological Potential and Innovations in Surkhandarya Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary educational institutions	6
Number of institutions with a postgraduate education system	2
Number of doctoral/postdoctoral students	-
PhD/Ds applicants graduated	-
Number of institutions engaged in R&D	8
Size of R&D financing	740.6 million UZS
Number of employees engaged in R&D	23
Number of implemented technological innovations	167
Number of new technologies acquired by institutions	-

Background

Surkhandarya region was formed on March 6, 1941 by the Decree of the Supreme Soviet of the USSR.

The first settlements in the Surkhandarya region date back to the Bronze Age. The old city, which lay just west of modern Termez and which was completely destroyed by the troops of Genghis Khan, was considered one of the largest trade centers and a major center of Buddhism.

Archaeologists have found Buddhist monasteries in the Surkhandarya region, near the city of Termez. it attracted many pilgrims. The numerous inscriptions in kharoshti and brahmi scripts testify it.

During the reign of Amir Temur (XIV-XV centuries) and his descendants, Termez was one of the most famous cities of Maverannahr and one of the main Amu Darya river crossing site of international trade route. The paths of caravans from China to the west in a southern direction, as well as from India to Maverannahr, crossed. Termez had a particularly important place in the trade and ambassadorial relations of the Temurids state with China in the first quarter of the 15th century. Trade caravans and ambassadors from Western countries that followed to Maverannahr during the reign of Amir Temur also usually crossed Termez.

SURKHANDARYA REGION

In the 15th century, the territory of the present Surkhandarya region belonged to the Sheibanid state.

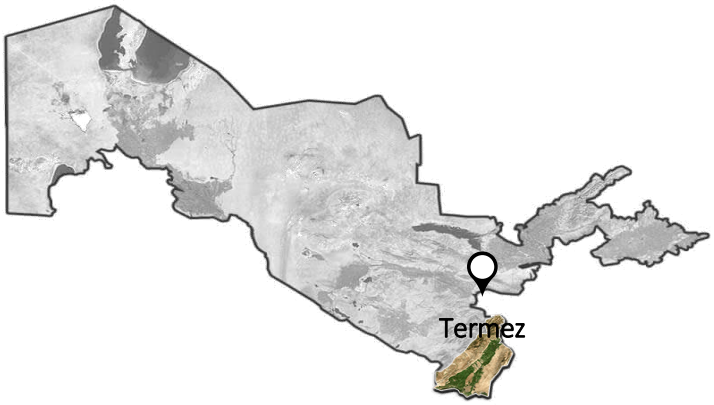
Termez was awarded the Order of Amir Temur in 2014.

Region's Economy

The foundation of the region's economy is the agro-industrial complex. Fine-fiber varieties of cotton are grown. 26 large industrial enterprises operate.

The leading industries are light and food industries in Surkhandarya Region. The mining takes a significant place.

There are reserves of oil, gas, coal, salt, gypsum and other minerals. Oil and gas fields locate near the cities of Haudag, Uchkyzyl, Lyalmikara and Kokaydy.



Development of Scientific and Innovative Activities in the Region

Six higher educational institutions conduct scientific and innovative activities in the region. There are no research Institutes in Surkhandarya Region.

1. Termez State University

In order to have qualified personnel in the region, the Council of Ministers of the Uzbek SSR made a decision to transfer the Margilan Teachers' Institute to Karshi and Termez on February 24, 1954. The Termez Pedagogical Institute was created on the basis of the Margilan Teachers' Institute in 1954.

Rector	Abdukodir Khamidovich Toshkulov
Vice-Rector for Research and Innovationss	Abdisamat Umirkulovich Sattarov, Ph.D. in Geography
Number of students	9,940
Number of teaching professors	717
of them, academic degrees are held by	149 (24 D.Sc. + 125 Ph.D.)

Faculties	1. Pedagogy 2. Natural Sciences 3. History 4. Chemical Engineering 5. Mathematics and Physics 6. Russian Philology 7. Foreign Philology 8. Uzbek Philology 9. Architecture and Civil Engineering 10. Economics and Tourism 11. Physical Education 12. Preschool Education 13. Art History

Currently, at the University, more than 9,900 students are trained under 58 bachelor's degree programmes, 474 graduate students are trained in 29 specialties, and 39 ones are trained as doctoral students.

In 2020, researchers of the Institute successfully defended 23 (Ph.D.) and 3 (D.Sc.) doctoral dissertations.

Currently, within the framework of research activities are:

- 1 fundamental project for the amount of 210.1 million UZS;
- 2 app projects for the amount of 2.6 billion UZS;
- 1 innovative project for the amount of 1.4 billion UZS;
- 1 international project for the amount of 78 thousand euros.

The university concluded 74 economic contracts amounting to 207.4 million UZS.

Professors and teachers of the university published 1 435 academic papers in 2019-2020, of which:

- 620 papers in foreign and republican scientific journals;
- 730 abstracts in the collections and proceedings of international and national conferences;
- 34 textbooks and teaching aids;
- 51 monographs.

In addition, 6 titles of protection were obtained within the framework of research activities.

2. Termez branch of Tashkent State Pedagogical University

In order to provide educational institutions of the region with qualified teachers, required to improve the organization of the system of training university-educated teachers to comply with international standards. The Termez branch of Tashkent State Pedagogical University was established in 2018 based on the tasks set forth in Resolution No. PP-2909 of the President of the Republic of Uzbekistan *On Measures for the Further Development of the Higher Education System* dated April 20, 2017.

Director	Kayum Shayimovich Baymirov, Ph.D. in Pedagogy
Deputy Director for Research and Innovations	Oliya Khamedovna Kadirova
Number of students	2,708
Number of teaching professors	89
of them, academic degrees are held by	13 (1 D.Sc. + 12 Ph.D.)
Faculties	1. Education 2. Natural Science and STEM

Currently, more than 2,700 students are trained under 8 bachelor's degree programmes at the Branch.

In 2020, the researchers of the university successfully defended their DSc dissertations. 6 dissertations are expected to be defended (1 - DSc and 5 - PhD) in 2021.

The professors and teachers of the Branch published 209 academic papers as part of their research activities in 2019-2020, of which:

- 3 papers in scientific journals included in the Scopus, Web of Science databases;
- 54 papers in other foreign scientific journals;
- 20 papers in republican scientific journals, reviewed by the Higher Attestation Commission;
- 50 papers in other republican scientific journals;
- 30 abstracts in the collections and proceedings of international conferences;
- 50 abstracts in the collections proceedings of national conferences;
- 2 monographs, study guides, textbooks.

4 certificates of authorship for software products were obtained and 5 applications for titles of protection were submitted in 2019-2020.

3. Termez branch of Tashkent State Agrarian University

The branch of the Tashkent State Agrarian University was established in the city of Termez in order to improve the system of higher education, training of personnel and specialists at the level of international standards in accordance with Resolution No. PP-2909 of the President of the Republic of Uzbekistan *On Measures for the Further Development of the Higher Education System* dated April 20, 2017.

Director	Prof. Abdugaffor Safarovich Djuraev, D.Sc., Economics
Deputy Director for Research and Innovations	Ashurali Avazovich Avliyakulov, Ph.D.
Number of students	2,043
Number of teaching professors	87
of them academic degrees are held by	26 (5 D.Sc. + 21 Ph.D.)
Faculties	1. Agronomy, Breeding and Seed Production 2. Fruit and Vegetable Growing and Technology 3. Agrologistics and Business

Currently, at the Branch, more than 2,000 students are trained under 9 bachelor's degree programmes and 10 are PhD students.

1 PhD and 1 (DSc dissertations were successfully defended in 2020.

As part of the ongoing research work in the period 2019 to 2020, the Branch signed 25 economic contracts for a total amount of 350 million UZS, of which 87 million UZS were spent.

The branch staff prepared 24 project applications for participation in state and 2 in international grant programs in agricultural areas.

As part of their research activities in the period 2019 to 2020, the professors and teachers of the Branch published 674 academic papers, including:

- 105 papers in foreign scientific journals;
- 127 papers in national scientific journals, reviewed by the Higher Attestation Commission;
- 143 abstracts in the collections and proceedings of international conferences;
- 278 abstracts in the collections and proceedings of national conferences;
- 21 monographs, teaching aids, textbooks.

4. Termez branch of Tashkent State Technical University

The Termez branch of Tashkent State Technical University was established in Termez in accordance with Resolution No. PP-3101 of the President of the Republic of Uzbekistan *On Measures to Organize the Activities of the Termez Branch of Tashkent State Technical University Named After Islam Karimov* dated June 29, 2017. Currently, the Branch has 2 faculties and 9 departments.

Director	Bakhodir Ergashevich Turaev
Deputy Director for Research and Innovations	-
Number of students	2,432
Number of teaching professors	110
of them academic degrees are held by	21 Ph.D.

Faculties	1. Light Industry and Chemical Engineering 2. Energy and Transport Systems

1 PhD dissertation was successfully defended in 2020. 3 PhD dissertations and 1 DSc dissertation are to be defended in 2021.

Research activities are carried out in the following areas:

- Radiometric determination of radionuclides in food;
- Ban on ultrafiltration of wastewater of light industrial colors;
- Creation and effective use of new technologies and technical means in the development of agriculture in the southern region of the country;
- Scientific and practical solutions for the use of a multi-range current transformer for objects of an industrial power supply system;
- Improvement of the methodological base for the use of information technologies in teaching general engineering in higher educational institutions;
- Development of technologies for obtaining local environmentally friendly products based on the chemical analysis of water, air and soil resources of underground and surface mineral resources of Surkhandarya Region;
- Production of two- and three-phase electricity using a wind turbine and its use in rural areas;
- Sociological foundations of working with families on the verge of divorce;
- Development of students' ecological culture with the help of modern educational technologies.

The implementation of 9 research and innovation projects is planned for 2020-2021.

The branch has workshops of computer design, an information technology and information resource centers.

The branch signed a Memorandum of Understanding with the higher educational institutions, i.e. the Ufa State University of Economics and Service in the Russian Federation, the Ufa State Petroleum Technical University and its Oktyabrsky branch, the Memorandum of Understanding was signed for the South Kazakhstan State University named after M.O. Auezov.

5. Termez branch of the Tashkent Medical Academy

The Termez branch of Tashkent Medical Academy was created on the basis of the Termez Medical College, which began its activities on February 1, 2018 on the initiative of the President of the Republic of Uzbekistan and in accordance with Resolution No. 172 of the Cabinet of Ministers dated March 5, 2018.

Director	Acting Director Ergash Abdullaevich Berdiev, Ph.D. (Medicine)
Deputy Director for Research and Innovations	Ergash Abdullaevich Berdiev, Ph.D. (Medicine)
Number of students	1,882
Number of teaching professors	103
of them academic degrees are held by	11 (1 D.Sc. + 10 Ph.D.)
Facultiy	1. General Medicine

The general fund of the Information Resource Center of the Branch is about 6,000 books, 1,470 books were purchased in academic year of 2019-2020. The Information Resource Center has 32 computers connected to the Internet, a Q-box system and a Wi-Fi zone.

The branch has 6 clinical sites:

1. Surkhandarya branch of the Republican Scientific Center for Emergency Medical Aid;
2. Regional Blood Transfusion Center;
3. Regional Endocrinological Dispensary;
4. Regional Children's Multidisciplinary Medical Center;
5. Regional Oncological Dispensary;
6. Regional Multidisciplinary Medical Center.

Currently, research is being carried out to study the specifics of diseases in a hot climate by example of Surkhandarya Region.

As part of their research activities in the period 2019-2020, the professors and teachers of the Branch published 209 academic papers, including:

- 17 papers in foreign scientific journals included in the Scopus, Web of Science databases;
- 40 papers in other foreign scientific journals;
- 10 articles in republican scientific journals, reviewed by the Higher Attestation Commission;
- 29 papers les in other republican scientific journals;
- 2 abstracts in the collections and proceedings of international conferences;
- 35 abstracts in the collections and proceedings of national conferences;
- 3 monographs, teaching aids, textbooks.

In addition, 2 utility model patents have been obtained in the last two years.

6. Denau Institute of Entrepreneurship and Pedagogy at Samarkand State University

The Denau Institute of Entrepreneurship and Pedagogy of Samarkand State University was created on the basis of the Denau branch of Termez State University in accordance with Resolution No. PP-4681 of the President of the Republic of Uzbekistan *On Measures to Expand and Further Improve the System of Training Highly Qualified Personnel in Surkhandarya Region* dated April 17, 2020.

SURKHANDARYA REGION

Director	Ganisher Khudaykulovich Rakhimov
Deputy Director for Research and Innovations	Ulugbek Eshkaraev
Number of students	3,394
Number of teaching professors	122
of them academic degrees are held by	26 (3 D.Sc. + 23 Ph.D.)
Faculties	1. Social and Economic Faculty 2. Pedagogy and STEM 3. Entrepreneurship and Management

The Institute is a state higher educational institution with the status of a legal entity. It is part of the system of the Ministry of Higher and Secondary Specialized Education.

The educational activities of the Institute began in the academic year of 2020/2021.

Cooperation has been established with prestigious higher educational institutions of developed countries in order to train and improve the qualifications of many graduates of the university in foreign educational establishments and to expand cooperation.

At the Institute, the Consulting Center was created. Its activities are aimed to support business entities, agricultural workers, workers in the production sector, as well as foreign grants of Surkhandarya Region, which contributes to the formation of projects for participation in international competitions and grant schemes.

SYRDARYA REGION

Administrative center	Gulistan
Administrative divisions	8 districts
Khokim	Gofurjon Ganievich Mirzaev
Area	5 100 km² (ranked 12th)
Population	853 200 people (ranked 13th)
Largest cities	Syrdarya, Bayaut, Hovos
GRP output	10 477.7 billion UZS (ranked 13th)
GRP structure	Agriculture, Forestry and Fisheries – 42.7% Industry – 26% Construction – 6.7% Trade and Services – 25%

Key indicators of Development of the Scientific and Technological Potential and Innovations in Syrdarya Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary educational institutions	2
Number of institutions with a postgraduate education system	1
Number of doctoral/postdoctoral students	41
PhD/Ds applicants graduated	-
Number of institutions engaged in R&D	4
Size of R&D financing	930.1 million UZS
Number of employees engaged in R&D	55
Number of implemented technological innovations	269
Number of new technologies acquired by institutions	-

Background

By the Decree of the Presidium of the Supreme Soviet of the USSR *On Partial Change of the Border between the Kazakh SSR and the Uzbek SSR* dated February 13, 1956, these lands were transferred to Samarkand Region of the Uzbek SSR.

The territory of the present Syrdarya Region used to be part of Tashkent Region when the Uzbek SSR was formed.

Part of the territory of the present Syrdarya Region was previously part of the South Kazakhstan Region of the Kazakh SSR.

On February 16, 1963, Syrdarya Region was formed on this territory with the center in the city of Yangiyer. It included the city of Jizzak and Jizzakh District of Samarkand Region, Kirov and Pakhtaaral Regions transferred from the Kazakh SSR, the cities of Yangier and Gulistan, Syrdarya, Gulistan and Yangiyer Districts of Tashkent Region.

Region's Economy

Railway tracks with a length of 400 km run through Syrdarya Region and connecting Tashkent and Jizzakh.

The economy of Syrdarya Region is based on agriculture, in particular on the production of cotton and wheat. The region has thousands of hectares of virgin lands that have been explored for agricultural purposes.

This area has a suitable irrigation infrastructure. Over the past few years, pumping stations and other irrigation facilities have been built.

In addition to cotton and wheat, livestock feed, vegetables, melons, pumpkins, potatoes, corn, various fruits and grapes are grown in the region. Breeding of cattle is successfully developing in the region.

The industry is based on the production of building materials and irrigation equipment, processing of raw cotton. In Gulistan, the administrative center of the Syrdarya region, there are mechanical repair, oil extraction, elevator-building and metal processing plants, a house-building plant, several sewing and weaving factories, electrical tool shops, etc.

The region has two large power plants:

1. Syrdarya GRES power plant is one of the largest power plants in Uzbekistan, producing a third of the country's electricity, the primary goal for the development of the industry is the export-oriented production.
2. Farkhad HPP (HPP-16) is a hydroelectric power plant built by the famous world-class architect Karakis I.Yu. on the Syrdarya River (near the city of Shirin).

Development of Scientific and Innovative Activities in the Region

Scientific and innovative activities in the Region are carried out by two higher educational unibersities. There are no research Institutes in Syrdarya Region.

1. Gulistan State University

Gulistan State University was founded in February 1992 on the basis of the Syrdarya State Pedagogical Institute (SSPI), which had worked since 1965.

Today, the University has the required material and technical base for teaching students and conducting research activities. The Fund of Center of Information Resources contains over 4,000 e-books and guides.

SYRDARYA REGION

Rector	Prof. Muksin Tadjievich Khodjiev, D.Sc. in Engineering
Vice-Rector for Research and Innovationss	Associate Prof. Amaliddin Nurbaevich Sulaymanov, Ph.D., History
Number of students	9,810
Number of teaching professors	450
of them academic degrees are held by	151 (34 D.Sc. + 117 Ph.D.)
Faculties	1. Information Technology 2. Social and Economic Faculty 3. Pedagogy 4. History of Art 5. Physical Education 6. Natural Sciences 7. Industrial Technology

The University gives great importance to the development of laboratories. The total area of the existing laboratories is 2008 m^2 in total. The university has 25 equipped teaching laboratories and 30 computer labs with over 700 computers, 400 of which are connected to the Internet.

More than 9,800 undergraduate students, 194 graduate students and 82 Ph.D. students in 44 specialties are trained at Gulistan State University.

In 2020, the university researchers defended 1 D.Sc. and 16 Ph.D. dissertations.

1 international research and 3 start-up projects were implemented in the period 2019 to 2020. Currently, research work is underway in Spiritual and professional training of an individum in the system of continuous education.

5 economic contracts were signed for the amount of 52 million UZS and 10 applications for patents were submitted within the framework of implemented projects in 2019-2020.

In 2020, professors and teachers of the Institute published 1 703 academic papers, including:

- 140 papers in scientific journals included in the Scopus, Web of Science databases;
- more than 300 articles in other foreign scientific journals;
- 156 papers in republican scientific journals recommended by the Higher Attestation Commission;
- 342 papers in other national scientific journals;
- 107 abstracts in the collections and proceedings of international conferences;
- 600 abstracts in the collections and proceedings of national conferences;
- 58 monographs, teaching aids, textbooks, textbooks of methods.

Gulistan State University is developing projects for participation in Tempus and ITEC international grant schemes. Today the university has established close ties with international institutions and organizations such as IWMI, ICARDA, and JIRCA. Joint activities are carried out with the universities of the CIS countries: Kemerovo State University, Lomonosov Moscow State University, Saint Petersburg State University, Stavropol State University, and Saratov State University.

2. Yangier branch of the Tashkent Chemical-Technological Institute

The branch of the Tashkent Chemical-Technological Institute was established in the city of Yangier by the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated July 9, 2019. In accordance with the Resolution, the primary goal of the Branch is the training and retraining of qualified personnel in chemical technologies, the active development of innovative research aimed at solving the problems of enterprises.

Director	Tolmas Farkhodovich Olimov
Deputy Director Research and Innovations	Associate Prof. Abdugani Jabbarov, Ph.D. in Engineering
Number of students	1,125
Number of teaching professors	14
of them academic degrees are held by	-
Faculty	1. Inorganic Substances Technology

Currently, more than 1,100 undergraduate students are being trained in 6 areas at the Yangier branch of the Tashkent Chemical-Technological Institute:

- Technology of inorganic substances;
- Technology of machinery and equipment;
- Technology of building materials;
- Food technology;
- Automation and management of production processes;
- Canning technology.

1 PhD dissertation was defended in 2020.

In 2020, professors and teachers of the Institute published 30 academic papers, of which:

- 6 papers in foreign scientific journals;
- 8 papers in republican scientific journals recommended by the Higher Attestation Commission;
- 4 papers in other national scientific journals;
- 4 abstracts in the collections and proceedings of international conferences;
- 8 abstracts in the collections and proceedings of national conferences.

SAMARKAND REGION

Administrative centre	Samarkand
Administrative divisions	14 districts
Khokim	Erkinjon Okbutaevich Turdimov
Area	16 800 km² (ranked 7th)
Population	3 878 000 people (ranked 1st)
Largest cities	Samarkand, Urgut, Pastdargom
GRP output	32 943.3 billion UZS (ranked 2nd)
GRP structure	Agriculture, Forestry and Fisheries – 47.9% Industry – 16% Construction – 5.1% Trade and services – 31%

Key Indicators of Development of the Scientific & Technological Potential and Innovations in Samarkand Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary educational institutions	10
Number of institutions with a postgraduate education system	7
Number of doctoral/postdoctoral students	285
PhD/Ds applicants graduated	81/10
Number of institutions engaged in R&D	14
Size of R&D financing	16 102.5 million UZS
Number of employees engaged in R&D	1,575
Number of implemented technological innovations	14
Number of new technologies acquired by institutions	1

Background

Samarkand Region as part of the Uzbek SSR was formed by the Decree of the Presidium of the Supreme Soviet of the USSR dated January 15, 1938.

An academy was created in Samarkand by Mirzo Ulugbek as early as in the 15th century. The Academy had an observatory, the richest library of that time and a higher educational institution - a madrasah. In madrasah, along with religious sciences were given classes of mathematics, geometry, astronomy, medicine, geography and other secular sciences. Kazizada Rumi, Giyasiddin Jamshid al-Kashi and Ali Kushchi are famous scientists worked at the Ulugbek Academy, and, accordingly, the research was very differentiated. Ulugbek's Academy in Samarkand made a significant contribution to the development of mathematics, astronomy and geography. Ulun, the unique catalog of 1,018 stars compiled in Samarkand. It based on 30-year observations and has remained the best in the world for many years. The achievements of the astronomical school of Ulugbek had a great influence on the development of science in the West and the East.

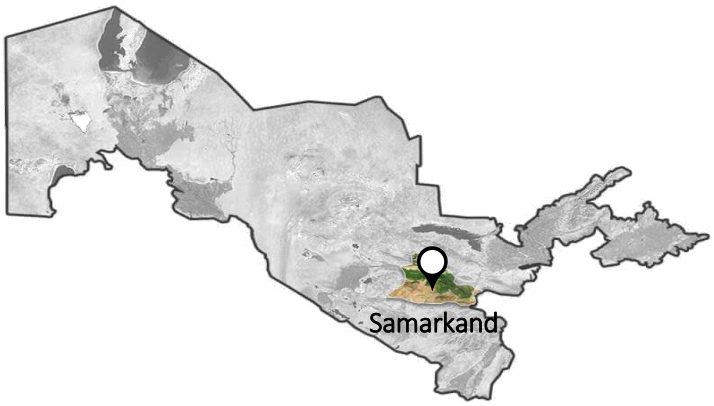
Karimov I.A., the first President of the Republic of Uzbekistan, was born in Samarkand. He ruled the country until the end of his days. Karimov I.A. buried at the Khazrati Khizr cemetery in his hometown, not far from the Shahi-Zinda memorial complex.

Region's Economy

The Samarkand region has a very extensive transport network, including highways and railways, as well as an international airport.

Samarkand airport has international status and is located on the northern outskirts of the city of Samarkand. It is the second largest and busiest (after Tashkent International Airport) airport in Uzbekistan.

Regular domestic flights to Tashkent, Bukhara, Urgench, Fergana are carried out from the Samarkand International Airport, so are foreign flights to cities in Russia (in particular, to Moscow and St. Petersburg), as well as to Stanbul (Turkey) and Dushanbe (Tajikistan).



Samarkand is one of the largest industrial and economic centers of Uzbekistan. The Leading industry is a mechanical engineering.

One of the largest automobile factories SamAuto operates in the city, producing buses and trucks of Isuzu brands; MAN Auto-Uzbekistan, producing trucks, special equipment and trailers of the MAN brand.

There are plans to open the Land Rover Uzbekistan automobile plant for the production of Land Rover off-road vehicles.

Light, construction, chemical, petrochemical, chemical-pharmaceutical and food industries are also developed.

There are factories of electronic equipment that produce resistors and integrated circuits, as well as electronic household appliances.

In addition, in Samarkand there is an elevator building plant that produces household refrigerators, the Sino plant, the UzBat cigarette factory for the processing and packaging of tobacco products, the Samarkand tea packing factory for the processing and packaging of tea products, the Samarkand wine plant, which is one of the oldest and the largest wineries not only in Uzbekistan, but also in Central Asia, the Samarkand distillery, etc.

There are also numerous private small businesses in Samarkand.

Tourism continues to be an important branch of the economy of Samarkand. The city is one of the most visited tourist centers in Uzbekistan. The income from tourism plays a big role in the economy of the region.

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The city, as Uzbekistan in general, is visited mainly by foreign tourists from Spain, Italy, France, Great Britain, Germany, Belgium and other countries of the European Union; from the CIS countries; Japan, South Korea, China and Turkey.

Development of Scientific and Innovative Activities in the Region

Research and innovation activities in the Region are carried out by nine higher educational institutions and four research Institutes.

1. Samarkand State University

The history of Samarkand State University (SamSU) begins in 1420, when Mirzo Ulugbek madrasah was founded.

The Uzbek State University was organized In 1933 and became one of the largest universities in Central Asia. In 1961, the Uzbek State University was renamed into the Samarkand State University named after Alisher Navoi.

Rector	Prof. Rustam Ibragimovich KLhalmuradov, D.Sc. in Engineering
Vice-Rector for Research and Innovations	Khakim Abdilkhakovich Khushvaktov, Ph.D., Mathematics and Physics
Number of sudents	26,131
Number of teaching professors	876
of them academic degrees are held by	478 (107 D.Sc. + 371 Ph.D.)
Faculties	1. Mathematics 2. Physics 3. Digital Technologies 4. Biology 5. Chemistry 6. Law 7. Education 8. Agrobiotechnology and Food Safety 9. Philology 10. Digital Economy 11. Geography and Ecology 12. Russian Philology 13. Psychology and Social Relations 14. History 15. Preschool Education 16. Art History

17. Physical Education
18. International Educational Programs

Currently, at the University, more than 26,000 students, 783 graduate students and 132 Ph.D. students are trained in 69 specialties.

In 2020, 47 PhD and 10 DSc dissertations were successfully defended by researchers of the University.

Research work was carried out on the basis of 17 economic contracs for the amount of 133.5 million UZS.

Currently, research activities are carried out in the following areas:

- The use of essential oils obtained from plants growing in various regions of Uzbekistan as local raw materials in the medical, perfumery and food industries;
- Development of technology for intensive cultivation and cultivation of medicinal plants for pharmaceuticals;
- Satisfaction of the need for imported products in the chemical industry, production of export-oriented products;
- Introduction of advanced technologies to improve the quality and yield of potatoes and practical substantiation of factors affecting yield;
- Development of methods and technologies for efficient application of mineral and organic fertilizers on saline lands;
- Development and implementation into practice of technologies for the effective use of organic fertilizers by drip irrigation;
- Research and implementation of problems of increasing fertility and maintaining soil moisture, etc.

In 2020, 17 fundamental and 2 applied scientific projects were carried out within the framework of the State Scientific and Technical Programs for a total of 2552.043 million UZS. Also, 3 unique objects (Nuclear Physics Laboratory, Museum of Zoology and Museum of Alisher Navoiy) were financed. The total amount of financing is 453.606 million UZS. The average surplus profit for each university teacher was 3.920 million UZS.

26 project applications were submitted for participation in the competition for international joint projects in 2020:

- 21 fundamental scientific research;
- 2 on the research of the life and work of Alisher Navoiy;
- 1 research by women scientists;
- 2 joint international studies.

Professors and teachers of the university published a total of 4,203 academic papers in 2019-2020, of which:

- 235 articles in scientific journals included in the Scopus, Web of Science databases;
- 637 articles in other foreign scientific journals;
- 653 articles in national scientific journals, reviewed by the Higher Attestation Commission;
- 34 articles in other national scientific journals;
- 899 abstracts in collections and materials of international conferences;

- 1 234 abstracts in the collections and proceedings of national conferences;
- 91 monographs;
- 140 teaching aids;
- 72 textbooks;
- 208 texbooks of methods.

In addition, 38 titles of protection were obtained within the framework of research activities, of which:

- 5 utility model patents;
- 1 patent for an invention;
- 1 patent for an industrial design;
- 1 patent for a plant variety;
- 30 certificates of authorship for software products.

More than 50 scientific research results of the SSU researchers have been introduced into various sectors of the national economy of the country. The construction of a building for the “Vivarium” laboratory will be completed in the neares future. In 2021, it is planned to purchase scientific equipment at the expense of the extra-budgetary funds of the University for:

- agrobiotechnological scientific laboratory (5 billion UZS);
- physical research laboratories (11 billion UZS);
- biological laboratories (7 billion UZS);
- chemical research laboratories (5 billion UZS);
- scientific research in mechanics (6 billion UZS).

The budgeted total amount of financing for equipping the laboratories of the university with scientific equipment is 33 billion UZS.

2. Silk Road International University of Tourism

The initiative to open a higher educational institution of tourism was put forward by Shavkat Mirziyoyev, the President of the Republic of Uzbekistan at the meeting of the heads of state of the Shanghai Cooperation Organization at the G8 Summit, held in Qingdao. The first state higher educational institution that has an international status was founded by Decree No. 3815 of the President of the Republic of Uzbekistan dated
June 28, 2018.

Rector	Aziz Abdukakhhorovich Abdukhakimov
Vice-Rector for Research and Innovations	-
Number of sudents	1,100
Number of teaching professors	54
of them academic degrees are held by	11 (1 D.Sc. + 10 Ph.D.)
Faculty	1. Tourism Management

Currently, about 1,100 students, 83 graduate students and 4 PhD students are trained at the University.

The “SINO-UZ” Research Center was established at the university in cooperation with Beijing International Studies University.

Currently, research activities are carried out in the following areas:

1. Cultural heritage management;
2. Event management;
3. Hotel management;
4. International hotel management;
5. Logistics in tourism;
6. Pedagogy of tourism;
7. Religious tourism;
8. Geography of tourism;
9. Sociology of tourism;
10. Cultural and historical tourism;
11. Economic Tourism;
12. Marketing;
13. Gastronomic tourism;
14. Ecological tourism;
15. Sports tourism;
16. Intercultural communication in tourism;
17. Digital tourism;
18. Creative industry;
19. Cycling tourism.

The University has developed more than 50 start-up projects of university students, which are in implementation phase.

In addition, the university has submitted 6 applications for participation in state grant schemes.

Professors and teachers of the university published a total of 254 academic papers in 2019-2020, including:

- 14 papers in scientific journals included in the Scopus, Web of Science databases;
- 70 papers in other foreign scientific journals;
- 18 papers in national scientific journals, reviewed by the Higher Attestation Commission;
- 35 papers in other national scientific journals;
- 70 abstracts in the collections and proceedings of international conferences;
- 45 abstracts in the collections and proceedings of national conferences;
- 2 monographs.

3. Samarkand State Institute of Economics and Service

The Institute was founded in March 2004 on the basis of the Samarkand Cooperative Institute created in 1931.

Currently, there are about 3,700 students in 11 educational areas, 168 graduate students and 21 PhD students in 10 specialties.

Rector	Prof. Mukhiddin Egamberdievich Pulatov, D.Sc., Economics
Vice-Rector for Research and Innovations	Associate Prof. Dilbar Khasanovna Aslanova, Ph.D, Economics
Number of sudents	3,673
Number of teaching professors	201
of them academic degrees are held by	78 (13 D.Sc. + 65 Ph.D.)
Faculties	1. Economics 2. Service 3. Banking and Financial Services

In 2020, 6 PhD dissertations were successfully defended by researchers of the Institute.

In the period 2019 to 2020, the Institute concluded 121 economic contracts totaling 200.1 million UZS.

Currently, research activities are carried out in *Theoretical and Practical Problems of the Development of the Service Industry*.

4 projects were implemented within under the State Scientific and Technical Program in the period 2019 to 2020, of which 1 fundamental research and 3 applied projects.

In addition, the Institute has submitted 11 applications for participation in state and 2 in international research projects.

In the period 2019 to 2020, professors and teachers of the Institute published a total of 2 534 academic papers, including:

- 49 papers in scientific journals included in the Scopus, Web of Science databases;
- 361 papers in other foreign scientific journals;
- 354 papers in national scientific journals, reviewed by the Higher Attestation Commission;
- 103 papers in other national scientific journals;
- 777 abstracts in the collections and proceedings of international conferences;
- 709 abstracts in the collections and proceedings of national conferences;
- 37 monographs;
- 79 teaching aids;
- 24 textbooks;
- 41 textbooks of methods.

In addition, 8 titles of protection were obtained within the framework of research activities, including:

- 5 certificates of authorship for software products;
- 3 certificates of authorship for trademarks.

4. Samarkand State Institute of Foreign Languages

Established by the Decree of the President of the Republic of Uzbekistan on November 8, 1994. The Samarkand State Institute of Foreign Languages is one of the outcome of the independence of our country. Currently, the Institute has become one of the leading, globally recognized centers for the training of highly qualified specialists in foreign philology for higher, secondary and secondary specialized education, as well as escorting interpreters for the tourist industry.

Rector	Prof. Ilkhom Madaminovich Tukhtasinov, D.Sc.
Vice-Rector for Research and Innovations	Associate Prof. Shakhobiddin Saidovich Ashurov, Ph.D., Philology
Number of sudents	6,442
Number of teaching professors	405
of them academic degrees are held by	90 (20 D.Sc. + 70 Ph.D.)
Faculties	1. English Language Faculty I 2. English Language Faculty II 3. Translation and Interpretation 4. Romano-Germanic languages

Currently, 6 442 students in 6 bachelor's degree programs, 320 graduate students in 5 specialties and 21 doctoral students in 7 specialties are trained at the Institute.

In 2020, researchers of the Institute successfully defended 12 PhD and 3 DcS dissertations.

In the period 2019 to 2020, the Institute concluded 34 economic contracts.

Currently, research activities are carried out in the following areas:

1. History of philosophy;
2. Theory of language. Practical and Computational Linguistics;
3. Language and literature of the peoples of Europe, America and Australia;
4. Comparative Literature, Linguistics and Translation;
5. Theory and methodology of teaching and education;
6. Theory of pedagogy. History of pedagogical teachings;
7. Theory and methodology of e-learning (by areas and stages of training).

The Institute has 5 scientific schools:

1. School of Derivatology;
2. General education and Romano-German linguistic school;

3. Problems of internal and external structure and its application in comparative typology;
4. Social features of language activity;
5. Social and philosophical problems of social development.

1 applied and 12 start-up projects are being implemented at the university in 2019-2020. In addition, the Institute has submitted 4 applications for participation in state grant schemes.

In the period 2019 to 2020, professors and teachers of the Institute published 1,165 academic papers, including:

- 32 papers in scientific journals included in the Scopus, Web of Science databases;
- 178 papers in other foreign scientific journals;
- 91 papers in national scientific journals, reviewed by the Higher Attestation Commission;
- 37 papers in other national scientific journals;
- 345 abstracts in the collections and proceedings of international conferences;
- 423 abstracts in the collections and proceedings of state conferences;
- 59 monographs, teaching aids, textbooks, textbooks of methods.

In addition, 5 certificates of authorship for trademarks were obtained within the framework of research activities.

5. Samarkand State Institute of Architecture and Civil Engineering

The Samarkand State Institute of Architecture and Construction was established by Decision No. 367 of the Council of Ministers of the Republic dated July 15, 1966 and by Order No. 307 of the Ministry of Higher Education dated July 15, 1966. Its creation was triggered, firstly, by the difficult socio-economic situation in Tashkent due to the earthquake, secondly, because of the image of Samarkand as the most ancient city in Central Asia with almost 3000 years of history, highly developed cultural traditions, and, thirdly, due to its status as a historically developed scientific and cultural center.

Rector	Associated Prof. Sultan Ilyasovich Akhmedov, Ph.D. in Engineering
Vice-Rector for Research and Innovations	Associated Prof. Erkin Khujayorovich Isakov, Ph.D. in Engineering
Number of sudents	6,333
Number of teaching professors	455
of them academic degrees are held by	140 (14 D.Sc. + 126 Ph.D.)
Faculties	1. Architecture 2. Civil Engineering 3. Engineering and Communication 4. Faculty Construction Management

Currently, at the Institute 6,333 students, 202 graduate students and 52 Ph.D. students are trained in 22 specialties. In 2020, researchers of the Institute successfully defended 6 Ph.D. and 1 D.Sc. doctoral dissertations.

In the period 2019 to 2020, the Institute concluded 51 economic contracts totaling 1,623 million UZS.

Currently, research activities are carried out in the following areas:

1. Improvement of energy efficiency, developing energy-saving technologies in the construction of residential complexes, buildings and structures;
2. Improvement of methods of conservation, protection and rational use of water resources, their evaluation and forecast;
3. Architecture of buildings and structures, effective architectural and design solutions for residential areas and urban planning. Smart city, microdistrict, garden, housing projects. Rural housing planning. Research principles of landscape architecture;
4. Seismology, seismic diagnostics, seismic forecasting, seismic zoning and seismic design;
5. Development, evaluation of modern construction technologies, modern regulatory framework and findings ways to reduce the expected damage in emergency situations;
6. Creation of new construction, composites and other materials based on waste and local raw materials;
7. Improvement of systems of geodesy, cartography and cadastre;
8. Improving the system of real estate appraisal, economics and construction management.

Projects implemented at the Institute in the period 2019 to 2020:

- 1 fundamental project for the amount of 113 million UZS;
- 1 applied project for 720 million UZS;
- 2 overseas projects worth of 63,000 euros.

In the period 2019 to 2020, professors and teachers of the Institute published 3 340 academic papers, including:

- 124 papers in scientific journals included in the Scopus, Web of Science databases;
- 170 papers in other foreign scientific journals;
- 239 papers in national scientific journals, reviewed by the Higher Attestation Commission;
- 82 papers in other national scientific journals;
- 540 abstracts in the collections and proceedings of international conferences;
- 1,890 abstracts in the collections and proceedings of national conferences;
- 295 monographs, teaching aids, textbooks, textbooks of methods.

30 economic contracts were concluded on industry-based orders under the Erasmus program and 2 foreign grants are being implemented through the Regional Testing Center of the Characteristics of Building Materials (RTC - Regional Test Center) and the Research Center for Research and Strengthening of Building Structures under the Institute.

The Institute has formed 26 innovative groups that work in 19 specialized departments to establish innovative corporate cooperation between higher education, science and production

The innovation group involved 305 people, including 154 professors and teachers, 67 representatives of enterprises, 2 Ph.D. students, 29 holders of master's degree, and 53 talented students. Contracts were signed with 36 organizations, 119 scientific and technical problems are being solved within the framework of innovative cooperation to date.

6. Samarkand State Medical Institute

Samarkand State Medical Unibersity is one of the largest medical educational institutions in Central Asia, providing training for highly qualified medical personnel. Samarkand State Medical Institute was created by Resolution No. 80 of the Council of People's Commissars of Uzbekistan dated May 7, 1930. Since then, more than 40 thousand qualified doctors have graduated from the Institute.

Rector	Prof. Jasur Alimjanovich Rizaev, D.Sc., Medicine
Vice-Rector for Research and Innovations	Shukhrat Khudoyberdievich Ziyadullaev
Number of sudents	6,062
Number of teaching professors	624
of them academic degrees are held by	242 (65 D.Sc. + 177 Ph.D.)
Faculties	1. General Medicine 2. Pediatrics 3. Higher Education in Nursing 4. Pharmacy 5. Curative Pedagogy 6. Dentistry 7. Preventive Public Health Care 8. International Education 9. Postgraduate Education

Currently, at the Institute 6,062 students, 359 graduate students and 145 Ph.D. students are trained. In 2020, researchers of the Institute successfully defended 20 Ph.D. and 2 Dc.S. dissertations.

Currently, research activities are carried out in the following areas:

1. Development of advanced technologies for the prevention, diagnosis and treatment of infectious and non-infectious diseases of social importance for humans;
2. Strengthening reproductive health, development of new technologies in the field of maternal, child and adolescent health care;
3. Development and implementation of modern technologies for prevention, diagnosis and treatment of injuries, surgical diseases and tumors;
4. Development and implementation of new drugs and innovative medical biotechnologies.

In total, the Institute is implementing 32 research projects and 33 applications for participation in state grant schemes were submitted.

In the period 2019 to 2020, professors and teachers of the Institute published 5,060 academic papers, including

- 197 papers in scientific journals included in the Scopus, Web of Science databases;
- 1,178 papers in other foreign scientific journals;
- 915 papers in national scientific journals, reviewed by the Higher Attestation Commission;
- 540 abstracts in the collections and proceedings of international conferences;
- 1,890 abstracts in the collections and proceedings of national conferences;
- 71 monographs;
- 44 teaching aids;
- 8 textbooks;
- 247 textbooks of methods.

The Institute obtained 10 patents for invention and 86 certificates of authorship for software products as part of its research activities.

7. Samarkand Institute of Veterinary Medicine

The Samarkand Institute of Veterinary Medicine was established in 2018 on the basis of the former Samarkand Institute of Agriculture, which had existed since 1929. It is one of the oldest Institutes in Uzbekistan.

Currently, more than 5,440 students are trained in 30 educational areas, 152 graduate students and 40 Ph.D. students are trained in 26 specialties.

Rector	Prof. Khudaynazar Beknazarovich Yunusov, D.Sc., Biology
Vice-Rector for Research and Innovations	Prof. Asadullo Suvonovich Daminov, D.Sc., Veterinary Medicine
Number of sudents	5,441
Number of teaching professors	416
of them academic degrees are held by	119 (25 D.Sc. + 94 Ph.D.)
Faculties	1. Biotechnology, Animal Processing Technology 2. Economics and Agrotechnology 3. Veterinary Prevention and Treatment 4. Veterinary Diagnostics and Food Safety 5. Animal Engineering

In 2020, researchers of the Institute successfully defended 18 Ph.D. dissertations.

The Institute concluded 44 economic contracts for a total amount of over 364 million UZS in 2019-2020.

Currently, research activities are carried out in veterinary medicine, zoo engineering, biotechnology, animal processing, economics and agricultural technology.

The Institute is implementing 6 applied projects to date:

- 1 in veterinary medicine;
- 2 in biotechnology;
- 1 in animal engineering;
- 2 in agricultural technique.

In addition, emloyees of the Institute submitted 41 project applications for participation in grant schemes, including:

- 39 for applied projects;
- 1 for an innovative project;
- 1 for an international joint project.

In the period 2019 to 2020, professors and teachers of the Institute published 2,119 academic papers, including:

- 220 papers in scientific journals included in the Scopus, Web of Science databases;
- 212 papers in other foreign scientific journals;
- 347 papers in national scientific journals, reviewed by the Higher Attestation Commission;
- 174 papers in other national scientific journals;
- 426 abstracts in the collections and proceedings of international conferences;
- 674 abstracts in the collections and proceedings of national conferences;
- 66 monographs, study guides, textbooks, teaching aids.

In addition, in the period 2019 to 2020, 17 titles of protection were obtained within the framework of ongoing research activities:

- 1 utility model patent;
- 5 patents for a plant variety;
- 11 certificates of authorship.

8. Samarkand branch of the Tashkent State University of Economics

The Samarkand branch of the Tashkent State University of Economics was established on May 28, 2019, by the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan *On the Organization of the Samarkand Branch of the Tashkent State University of Economics* dated May 28, 2019.

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Director	Prof. Olim Murtazaev, D.Sc., Economics
Deputy Director for Research and Innovations	Zafar Khasanovich Abdullaev, Ph.D.
Number of sudents	735
Number of teaching professors	47
of them academic degrees are held by	12 (1 D.Sc. + 11 Ph.D.)
Faculties	1. Economics

At present, at the Branch 735 students and 2 doctoral students are trained in 4 specialties.

In 2020, researchers of the Branch successfully defended 3 PhD dissertations.

Currently, research activities are carried out in the following areas:

- Analysis of the state of increasing the efficiency of the use of material and technical resources of cotton;
- Development of proposals and recommendations to improve economic relations between agricultural services and farms;
- Development of scientific and methodological proposals and practical recommendations for improving the methodology for the economic assessment of the environmental costs of agricultural production and agro-ecosystem services;
- Development of an optimal value chain model based on an assessment of the economic impact of digital transformations on agriculture and the food system;
- Identification of problematic issues related to the practical application of the International Financial Reporting Standard;
- Improvement of the clustering methodology and optimization of logistics processes in horticultural farms;
- Development of an effective algorithm and program for the numerical solution of problems in semi-infinite and finite layers based on the generalized kinetic equation of suspension leakage in porous media and taking into account dynamic factors.

The Branch is currently implementing the following projects:

- Coffee delivery service project;
- Creation of an international portal of the electronic library;
- The “Smart Communication Service”, online training program;
- Production of environmentally friendly products from polyethylene waste, textiles and genuine leather products on a modern 3D printer;
- The project of creating an innovative virtual museum, fully reflecting the era of Amir Temur, to further increase the tourist potential.

The Branch participates in the following competitions announced by the Ministry of Innovative Development of the Republic of Uzbekistan to solve regional problems of the economy of the Samarkand region:

1. An agreement was reached on the AgroDev project - *Development of Higher Education Content Aimed to Support Industries for Sustainable Production of Qualitative Agri-food by ERASMUS_PLUS in*

cooperation with the Latvian University of Natural Sciences and Technology. The Project will start on January 15, 2021.

2. "Competition of multilateral scientific and technical projects of the Russian Foundation for Basic Research along with the Eurasian Association for Research Support". The St. Petersburg State Agrarian University of the Russian Federation (coordinator) and the Polish State University (Belarus) are participating in the competition for the Project *Development and Phased Implementation of Web-Platform Reflecting the Relationship of the Agrarian Sector of the Eurasian Economic Union in Rural Areas*.
3. The Project *Usage of Advanced Digital Technologies in Soil Monitoring Based on Plant Protection and Automatic Irrigation* is submitted for the Uzbek-Indian competition of joint scientific and technical projects in cooperation with the Central Scientific Research Institute of Mechanical Engineering in Durgapur. Currently, agreements are being signed with Indian partners on the terms of the Project.
4. The Branch participates in the Project *Creation of an Electronic Platform for Methodological Support of Teaching Uzbek as a Foreign Language*". This Project is currently being reviewed by the Ministry of Innovative Development of the Republic of Uzbekistan.

In the period 2019 to 2020, professors and teachers of the Branch published 73 academic papers, including:

- 3 papers in scientific journals included in the Scopus, Web of Science databases;
- 18 papers in other foreign scientific journals;
- 3 papers in national scientific journals, reviewed by the Higher Attestation Commission;
- 3 a papers in other national scientific journals;
- 25 abstracts in collections and materials of international conferences;
- 18 abstracts in collections and materials of national conferences;
- 3 monographs, teaching aids, textbooks.

9. Samarkand branch of Tashkent University of Information Technologies

The Samarkand branch of the Tashkent University of Information Technologies named after Muhammad al-Khorezmi was created in accordance with Resolution No. PP-91 of the President of the Republic of Uzbekistan *On Improving the Education System in the Field of Information Technology* dated June 2, 2005.

Currently, the branch has 3 educational buildings and 1 dormitory. There 18 modern lecture halls, 32 practical classrooms, 16 computer labs, 5 educational laboratories, 1 language laboratory, an information resource center, and a gym for students.

Director	Zainidin Abduvalievich Karshiev, Ph.D. in Engineering
Deputy Director for Research and Innovations	Olimjon Rashidovich Yalgashev, PhD
Number of sudents	2,266
Number of teaching professors	122

of them academic degrees are held by	42 (3 D.Sc. + 39 Ph.D.)
Faculties	1. Computer Engineering 2. Telecommunication Technology and Vocational Education

In 2020, 6 PhD dissertations were successfully defended by researchers of the Branch.

In the period 2019 to 2020, the Branch concluded 3 economic contracts as follows:

- for the provision of services when updating the anti-virus software database;
- for the development of the "Made in Samarkand" platform;
- for conducting Lab-based seminars for web programming students.

Currently, 2 fundamental projects and 1 research by young scientists are being implemented within the framework of research activities. In addition, 4 project applications have been submitted for participation in the following grant schemes.

1. Erasmus program + Supporting the Professionalization of Health Engineering studies and Related areas in Asia (SPHERA);
2. Comprehensive education system of South Korea, KOICA program;
3. World Friends ICT Volunteers;
4. KOICA volunteer program in South Korea.

In the period 2019 to 2020, professors and teachers of the Branch published 644 academic papers, including:

- 54 papers in scientific journals included in the Scopus, Web of Science databases;
- 34 papers in other foreign scientific journals;
- 40 papers in national scientific journals, reviewed by the Higher Attestation Commission;
- 125 abstracts in the collections and proceedings of international conferences;
- 367 abstracts in the collections and proceedings of national conferences;
- 24 monographs, teaching aids, textbooks, textbooks of methods.

36 certificates of authorship for software products were obtained within the framework of ongoing research activities in 2019-2020.

10. Research Institute of Karakul Breeding and Desert Ecology

The Research Institute of Karakul Breeding and Desert Acology was formed by Resolution No. PP-2125 of the President of the Republic of Uzbekistan dated February 10, 2014.

In 2020, researchers of the Institute successfully defended 7 PhD dissertations.

Director	Prof. Nasillo Asadovich Bobokulov, D.Sc. in Agriculture
Deputy for Research and Innovations	Asror Khudoyberdievich Khatamov, Ph.D.
Number of PhD students	9
Number of employees	42
of them academic degrees are held by	25 (4 D.Sc. + 21 Ph.D.)

Currently, the research activities of the Institute are carried out in the following areas

1. Breeding, selection, genetics and reproduction of farm animals;
2. Private animal husbandry, technology for the production of livestock products;
3. Crop production.

Today, the Institute is implementing 8 applied and 1 innovative projects. In addition, researchers the Institute prepared 5 project applications for participation in state grant schemes.

In the period 2019 to 2020, researchers of the Institute published 644 academic papers, including:

- 3 papers in scientific journals included in the Scopus, Web of Science databases;
- 25 papers in other foreign scientific journals;
- 60 papers in national scientific journals, reviewed by the Higher Attestation Commission;
- 116 papers in other national scientific journals;
- 25 abstracts in the collections and proceedings of international conferences;
- 116 abstracts in the collections and proceedings of national conferences;
- 17 monographs, teaching aids, textbooks, textbooks of methods.

2 patents for invention and 2 patents for plant varietied were obtained within the framework of ongoing research activities in 2019-2020.

11. Research and Development Institute of Veterinary Medicine

The Research and Development Institute of Veterinary (RDIVM) at the State Committee for the Development Veterinary Medicine and Animal Husbandry of the Republic of Uzbekistan was founded in 1926. It was the largest research institution in the veterinary medicine in the countries of the Central Asian region.

Director	Bozorboy Aktamovich Elmurodov, D.Sc., Veterinary Medicine
Deputy Director for REsearch and Innovations	Mukhiddin Akhrorovich Ruzimurodov, Ph.D., Veterinary Medicine
Number of PhD students	9
Number of employees	48
из них имеют ученые степени	22 (12 D.Sc. + 10 Ph.D.)

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The Institute of Veterinary Medicine is the only specialized budget-funded institution in the Republic engaged in solving specific scientific and research problems in the field of veterinary medicine and training scientific personnel for the country. Certain work is being done on the professional training of scientific personnel on epizootology, prevention, diagnosis, treatment and organization of measures to combat diseases of animals, birds, bees and fish.

In 2020, researchers of the Institute successfully defended 2 PhD and 2 DSs dissertations.

In the RDIVM, laboratories are to be created for conducting a complex of scientific research on a wide range of diseases of fish, bees and birds, including especially dangerous and quarantine infections and providing practical assistance to farms.

The Institute has scientific laboratories in the following areas

- Acarology and arachnoentomology;
- Diseases of birds and bees;
- Brucellosis;
- Veterinary hygiene and pathology of reproduction;
- Virology;
- Helminthology;
- Immunology and biotechnology;
- Microbiology;
- Protozoology;
- Regional diagnostics;
- Tuberculosis;
- Helminthiasis;
- Pathological anatomy;
- Biological control, development and standardization.

Research work is carried out in the following areas:

- Veterinary microbiology, virology, mycology, immunology and epizootology;
- Pathomorphology;
- Zoology.

The RDIVM focuses on developing and improving means and methods of controlling the most common infectious, invasive and noncontagious diseases of farm animals and birds, taking into account livestock breeding and hot climate of Uzbekistan. The research has both applied, innovative and fundamental character and covers most of the issues of regional pathology, fauna and biology of causative agents of various diseases, epizootology, clinical manifestation, diagnosis, pathogenesis and control measures for those or other common diseases of farm animals and birds.

In 2019-2020 more than 240 contracts were concluded for a total amount of 1,850 million UZS.

Being the only manufacturer of immunobiological preparations for the needs of the livestock and poultry sectors of the Republic, VRI seeks to find partners to establish joint production facilities and increase the

range and volume of production on the basis of the Institute. (the RDIVM currently sells drugs for the amount of about 950 milliom to 1 billion UZS per year).

One of the main indicators of the Institute is the implementation of research results in production. Scientists of NIIV have developed and have production technologies for 30 items of veterinary drugs, 7 of which are currently ready and implemented for the needs of livestock and veterinary medicine.

One of the main indicators of the Institute is the implementation of research results in production. Researchers of the RDIVM have developed and have production technologies for 30 items of veterinary drugs, 7 of which are currently ready and implemented for the needs of livestock and veterinary medicine.

By the end of 2020, Institute produced vaccines, diagnosticum and other products amounting to more than 840 million UZS.

To date, the Institute has implemented 7 applied and 2 innovative projects. In addition, in 2020, a state project for the amount of 1.3 billion UZS was carried out on the Unique object storage, restoration of strains of microorganisms.

In the period 2019 to 2020, employees of the Institute prepared 12 project applications for participation in the state and 1 - in the international grant programs.

In the period 2019 to 2020, researchers of the Institute published 232 academic papers, including:

- 15 papers in scientific journals included in the databases Scopus, Web of Science;
- 10 papers in other foreign scientific journals;
- 147 papers in national scientific journals, reviewed by HAC;
- 15 abstracts in the collections and proceedings of international conferences;
- 15 abstracts in the collections and proceedings of national conferences;
- 30 monographs, teaching aids, textbooks, textbooks of methods.

Also as part of the ongoing research activities in 2019-2020, 4 patents for invention were obtained, 4 applications for utility model patents were submitted.

The RDIVM is the main developer of normative and technical documentation for the practical veterinary service and specialized universities. The Institute owns more than 40 patents for inventions, author of more than 150 normative and technical documents (recommendations, instructions, manuals, methodical instructions, production regulations, organization standards, etc.) which are put into practice and widely used in the livestock sector in Republic.

12. National Center for Archaeology

In accordance with Resolution No. 792 of the Cabinet of Ministers *On the Radical Improvement of Archaeological Research* dated September 21, 2019, the National Center of Archeology was created within the Academy of Sciences in the form of a state institution on the basis of the Institute of Archaeological Research of the Academy of Sciences.

Director	Farkhod Alijonovich Maksudov, Ph.D. in History
Deputy Director for Research and Innovationd	Muminjkhon Munir ugli Saidov, Ph.D. in History
Number of doctoral students	10
Number of employees	59
of them academic degrees are held by	37 (9 D.Sc. + 28 Ph.D.)

There are currently 8 departments and laboratories and 1 unique facility at the Center:

- Department of Interdisciplinary Studies;
- Department of Silk Road Archaeology;
- Department of Rescue Archaeology;
- Department of Stone Age and Early Metal Archaeology;
- Department of archaeology of the ancient Middle Ages;
- Department of Chemical and Technological Research and Conservation of Historic Monuments;
- Laboratory of Bioarchaeology;
- Laboratory of landscape archaeology;
- Unique scientific facility “Fund of Archaeological Finds.”

In 2020, the research staff of the Center successfully defended 3 PhD dissertations and 1 D. Sc. dissertation.

In the period 2019 to 2020, the Centerconcluded economic contracts totaling more than 719.7 million UZS.

Scientific areas of research work include:

- Study the history of the material and spiritual culture of Uzbekistan from the ancient Stone Age to the developed Middle Ages inclusive;
- Development of a chronology and periodization of the cultures of the periods under study;
- Development of the territory of Uzbekistan by primitive man;
- Formation of civilization, early towns and statehood, and the worldview of ancient societies;
- Study of the origins and development of world religions, crafts, metallurgy and mining;
- Identification, mapping and introduction into scientific circulation of archaeological monuments.

Currently, 3 applied and 2 innovative projects are being implemented by the employees of the Center. In addition, in 2020 3 fundamental and 2 applied projects were prepared and applications for participation in state grant programs were submitted.

In the period 2019 to 2020, in the framework of research activities researchers of the Center published 366 academic papers, including:

- 8 papers in scientific journals included in the databases Scopus, Web of Science;
- 94 papers in other foreign scientific journals;
- 78 papers in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 56 articles in other republican scientific journals;

- 49 abstracts in collections and proceedings of international conferences;
- 77 abstacts in collections and proceedings of national conferences;
- 2 monographs;
- 2 catalogs of archaeological monuments.

13. Branch of the Republican Specialized Scientific and Practical Medical Center for Epidemiology, Microbiology, Infectious and Parasitic Diseases

The Branch of the Republican Specialized Scientific and Practical Medical Center for Epidemiology, Microbiology, Infectious and Parasitic Diseases named after L.M. Isayev was established on December 24, 1923. Its activity is aimed at research in entomology and transmissible diseases, clinical parasitology and medical helminthology, serological and cultural studies, molecular biology of parasitosis.

Director	Suvonkulov Uktamzhon Toirovich, Ph.D., Medicine
Deputy Director for Research and Innovation	-
Number of doctoral students	-
Number of employees	16
of them academic degrees are held by	8 (3 D.Sc. + 5 Ph.D.)

Research work is carried out in the following areas:

- Creation of modern methods of diagnosis, treatment and prevention of parasitic diseases;
- Creation of vaccines against parasitic diseases;
- Creation of diagnostic test systems (PCR and serological) for diagnosis of parasitic diseases.

Currently, the Institute implements 1 applied project on “Creation of prognostic model of zoonotic and anthroponotic cutaneous leishmaniasis spread in Uzbekistan”. In addition, the Institute staff prepared 1 project application for participation in the international grant program KOICA (South Korea).

Scientific staff of the Institute in the period 2019 to 2020 published 32 academic papers, including:

- 7 papers in scientific journals included in the databases Scopus, Web of Science;
- 3 papers in other foreign scientific journals;
- 11 papers in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 2 papers in other republican scientific journals;
- 2 abstracts in collections and proceedings of international conferences;
- 5 abstracts in collections and proceedings of the national conferences;
- 2 monographs.

Also as part of the ongoing research activities in the period 2019 to 2020, 1 application for a certificate of authorship for a software product was filed.

SAMARKAND REGION

The Institute has signed memorandums of international cooperation with the following organizations:

- I.M. Sechenov First Moscow State Medical University;
- Yonsei University (South Korea);
- Busan National University (South Korea);
- University of Pavia (Italy);
- The Institute is a partner of KOICA Agency.

TASHKENT REGION

Administrative center	Nurafshan
Administrative divisions	15 districts and 7 cities
Khokim	Rustam Kurbonnazarovich Kholmatov
Area	15 300 km² (ranked 8th)
Population	2 961 600 people (ranked 5th)
Largest cities	Yangiyul, Kibray, Zangiota, Angren
GRP output	26,506 billion UZS (ranked 1st)
GRP structure	Agriculture, Forestry and Fisheries – 23.9% Industry – 47.2% Construction – 5.1% Trade and Services – 23.8%

Key Indicators of Development of the Scientific and Technological Potential and Innovations in Tashkent Region in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary education institutions	6
Number of institutions with a postgraduate education system	3
Number of doctoral/postdoctoral students	127
PhD/Ds applicants graduated	56/14
Number of institutions engaged in R&D	25
Size of R&D financing	68 596,4 million UZS
Number of employees engaged in R&D	1 404
Number of implemented technological innovations	623
Number of new technologies acquired by institutions	3

Background

The region was formed on January 15, 1938 as part of the Uzbek SSR. In 1950-1951, N.A.Mukhitdinov was the first secretary of the regional committee of the All-Union Communist Party (b). Until July 20, 2017, the administrative center of the region was the city of Tashkent, now it is Nurafshan.

The first scientific institution in Uzbekistan in the 19th century, the Tashkent Physical and Astronomical Observatory (today the Astronomical Institute of the Academy of Sciences of Uzbekistan) was organized in 1873. Initially the observatory organized expeditions which resulted in determination of exact coordinates of over a thousand locations in the region, and only by the 1930s the observatory began to solve research problems of basic astronomical science.

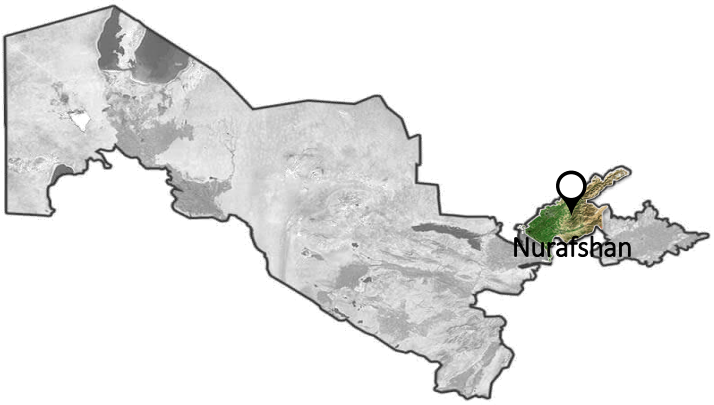
In the twenties a number of research Institutes in history, medicine, natural sciences, etc. were opened.

In the 1920s, a number of research Institutes were opened in the field of history, medicine, natural sciences, etc.

Region's Economy

Tashkent region is rich in the largest mines and mineral deposits. In particular, there are 5 large mines of Uzbekistan located in the city of Almalyk:

- Kurgashinkan mine (deposits of lead, zinc, gold, silver, copper, cadmium, bismuth and some other rare-earth elements);
- Altyn-Topkan mine (polymetallic deposits);
- Kalmakyr mine (copper deposit);
- Sary-Cheku mine (copper-molybdenum deposit);
- Uch-Kulach mine (lead-zinc-barite deposit).



Almalyk is the center of non-ferrous metallurgy in Uzbekistan.

An important step in the development of non-ferrous metallurgy in Uzbekistan in the post-war period and the formation of the city was the construction of the Almalyk mining and smelting plant. In addition, the town has a lead-zinc concentrator, the Almalyk copper concentrator, a zinc smelter, a copper smelter consisting of a smelting shop, a copper electrolyte smelter and sulfuric acid shops. Sulfuric acid shops were created at the zinc and copper smelter, and a sulfuric acid and liquid sulfuric anhydride shop was created on the basis of utilization of poor sulfuric gases.

In addition, one of the largest chemical plants producing ammophos, extractive phosphoric acid and sulfuric acid, Ammophos-Maksam JSC, which is a part of Uzkimyosanoat SJSC, is located in Almalyk.

The center of the coal industry of Uzbekistan is Angren, where lignite is extracted (Uzbekkumir (Uzbekugol) JSC).

The only gas production station in the country by the method of underground pyrolysis of coal (underground gas) Yerostigaz JSC is located in Angren.

Such large enterprises as factories of construction materials (concrete, cement, ceramics, etc.), food factories (Angrennon - production of bread, Angrensut - production of dairy products), chemical-metallurgical, machine-building, nitrogen-fertilizer plants, etc. are engaged in their activities.

Development of Scientific and Innovation Activities in the Region

Research and innovation activities in the region are carried out by four institutions of higher education and ten research Institutes.

1. Chirchik State Pedagogical Institute

The Chirchik State Pedagogical Institute of Tashkent region was formed by Resolution No. PP-3152 of the President of the Republic of Uzbekistan dated July 27, 2017 to meet the needs of pre-school, school and non-formal educational institutions of Tashkent region in educators, elementary school teachers, subject teachers, especially teachers of foreign languages in accordance with international standards.

Rector	Prof. Gafurjan Isroilovich Mukhamedov, D.Sc. in Chemistry
Vice Rector for Research and Innovations	Prof. Odiljon Egamberdievich Ziyadullaev, D.Sc. in Chemistry
Number of students	12,172
Number of teaching professors	284
of them, academic degrees are held by	77 (17 D.Sc. + 60 Ph.D.)
Faculties	1. Stem 2. Natural Sciences 3. History and Languages 4. Pedagogy 5. Preschool and Elementary Education 6. Sports and Military Training

Currently, the Institute has more than 12,000 students, 153 graduate students and 28 doctoral students in 27 specialties.

In 2020, employees of the Institute successfully defended 8 PhD and 6 DSc dissertations.

Currently, research activities are conducted in the following areas:

- Isolation of potato virus X isolate, widespread in Uzbekistan, study of its properties and diagnostics;
- Scientific and theoretical foundations of the innovative cluster of pedagogical education;
- Technology of correctional and developmental work with deaf students in grades 1-2 on the formation and development of auditory perception and pronunciation;
- Improving the content of education and developing the competence of students on the basis of subject and key competencies;
- Inheritance and relationship of cotton quality traits;
- Oscillatory and rotational spectroscopy of molecules in the liquid phase;
- Crystal and glass Holcogen electronic interaction of SN centers in semiconductors Mössbauer study;
- Tensostimulated phenomena in compensated silicon and in surface barrier diode structures based on it;
- Synthesis of acetylenic alcohols based on terminal alkynes and ketones in the presence of various catalysts.

In the period 2019 to 2020, 6 research projects were carried out within the framework of the State scientific and technical programs. To date, 1 project application for participation in the state grant program has been prepared.

In the period 2019 to 2020, professors and lecturers of the Institute published 2,414 academic papers, including:

- 191 articles in scientific journals included in the databases Scopus, Web of Science;
- 254 articles in other foreign scientific journals;
- 418 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 325 articles in other republican scientific journals;
- 510 abstracts in the collections and proceedings of international conferences;
- 701 abstracts in the collections and proceedings of national conferences;
- 9 monographs;
- 6 textbooks.

In addition, as part of the research activities were obtained 27 documents of protection, of which:

- 4 utility model patents;
- 6 patents for invention;
- 2 patents for industrial design;
- 15 certificates of authorship for software product, 4 utility model patents;

2. Tashkent State Agrarian University

Tashkent State Agrarian University was formed on May 26, 1930. On that day, the Secretariat of the MIC of the former USSR decided to establish an independent Central Asian Agricultural Institute on the basis of the Agriculture of the Central Asian State University. In 1934 with some organizational changes it was renamed as Tashkent Agricultural Institute. On April 11, 1991, by decision of the governing body of the former Soviet Union it was granted the status of university and was renamed into Tashkent State Agrarian University.

Rector	Botirjon Abdushukirovich Sulaimonov, D.Sc. in Biological Sciences
Vice Rector for Research and Innovation	Komolitdin Sadriddinovich Sultonov, D.Sc. in Agricultural Sciences
Number of students	7,485
Number of teaching professors	494
of them, academic degrees are held by	313 (82 D.Sc. + 231 Ph.D.)
Faculties	1. Agrobiology 2. Horticulture and Viticulture 3. Forestry and Landscape Design

4. Silk Farming
5. Storage and Processing of Agricultural Products
6. Agrology and Business
7. Plant Protection, Agrochemistry and Soil Science

Currently, the university has more than 7,400 students in 29 bachelor's degree programs, 420 master's students in 33 specialty areas and 94 doctoral students.

In 2020, the Institute's research staff successfully defended 32 (PhD) Ph.D. theses and 12 (DSc) doctoral theses.

In the period 2019 to 2020, 97 economic contracts worth 2,410 million UZS were concluded.

In the period 2019 to 2020, 51 projects worth 5,973 million UZS were implemented within the framework of State scientific and technical programs, of which:

- 2 fundamental projects;
- 31 applied projects;
- 2 innovation projects;
- 6 research of young scientists.

Also, the university conducts joint projects within the framework of foreign grant programs of FAO, KOPIA and USAID.

Professors and lecturers of the university published a total of 2,827 academic papers in 2019-2020, including:

- 45 articles in scientific journals included in the databases Scopus, Web of Science;
- 472 articles in other foreign scientific journals;
- 365 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 587 articles in other republican scientific journals;
- 448 abstracts in the collections and proceedings of international conferences;
- 685 abstracts in the collections and proceedings of national conferences;
- 225 monographs, textbooks, manuals.

In addition, as part of the research activities were obtained 97 protective documents, of which:

- 35 utility model patents;
- 22 patents for invention;
- 12 design patents;
- 15 patents for plant variety;
- 13 certificates of authorship for software product.

At the university operates agricultural research station, 4 research centers:

- Plant Biotechnology Center;
- Center for Biological Protection of Plants;
- Center for Plant Biotechnology “Biomarkaz”;
- Fungicenter.

3. Uzbek State University of Physical Culture and Sports

On September 27, 1955, the Tashkent Institute of Physical Culture was established in Tashkent by Resolution No. 653 of the USSR Council of Ministers.

On March 5, 2018, in accordance with Decree UP-5368 of the President of the Republic of Uzbekistan *On Measures to Radically Improve the System of State Administration in the Sphere of Physical Culture and Sports*, the Uzbek State Institute of Physical Culture was reorganized into the Uzbek State University of Physical Culture and Sports.

Rector	Prof. Makhmudjon Rustamovich Boltabaev, D. Sc., Economics
Vice Rector for Research and Innovation	Kamil Faritovich Bajazitov,PhD in Pedagogy
Number of students	8,500
Number of teaching professors	428
of them, academic degrees are held by	102 (11 DSc. + 91 PhD.)
Faculties	1. Sports Management and Professional Sciences; 2. Sports Games; 3. Athletic Martial Arts; 4. Athletic Multiathlon; 5. Soccer and Winter Sports.

Currently, at the University, 8,500 students, 211 graduate students and 6 doctoral studentsare trained.

In 2020, the research staff of the University successfully defended 18 PhD dissertations.

Currently, research activities are conducted in the following areas:

- Development of the system of preparation of highly qualified athletes in the national teams, the development of professional and pedagogical skills and competencies of specialists in physical culture and sports on the basis of improving the theoretical and methodological foundations of physical culture and sports activities.
- Biological and physiological basis of training of qualified athletes in the field of physical culture and sports.
- Development of philosophical and legal, psychological and sociological research in the field of popularization of physical culture and sports, as well as improving the system of training in the field of sports management, marketing.

In 2020, within the framework of the State scientific and technical programs, 2 applied research projects were implemented for a total amount of 598 million UZS.

In 2020, 2 project applications on the following topics were submitted for participation in the competition of international joint projects::

- Involvement and psychological support of children with disabilities in sports clubs with the help of parents;
- Scientific and social basis of orientation of children with disabilities to sports and professions.

Professors and lecturers of the university in the period 2019 to 2020 published 1,495 academic papers, including:

- 20 articles in scientific journals included in the databases Scopus, Web of Science;
- 97 articles in other foreign scientific journals;
- 320 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 56 articles in other republican scientific journals;
- 260 theses in collections and proceedings of international conferences;
- 598 theses in collections and proceedings of national conferences;
- 16 monographs;
- 78 textbooks and manuals;
- 50 methodical manuals.

In addition, as part of the research activities were obtained 13 protective documents, including:

- 3 patents for invention;
- 10 certificates of authorship for software product;
- Also, 10 applications for protective documents were submitted.

The University organized the activity of the Academic Council of the specialty “DSc.03/30.2019. Ped.28.01 № 13.00.04 - Theory and Methodology of Physical Education and Sports”. As of September 2020, 14 researchers have defended their dissertations in the Council, 16 researchers have successfully passed the scientific seminar, currently 10 researchers are preparing for the scientific seminar.

4. Almalyk branch of Tashkent State Technical University

By Order No. 3153 of the President of the Republic of Uzbekistan dated June 27, 2017, the Almalyk branch of the Tashkent State Technical University named after Islam Karimov, was created to replace the Almalyk Faculty of Mining and Metallurgy of the Navoi State Mining Institute.

Director	Associate Prof. Alisher Usmonovich Samadov, D.Sc. in Engineering
Deputy Director for Research and Innovation	Associate Prof. Doniyor Bakhtiyorovich Kholikulov, D.Sc. in Engineering
Number of students	3,024
Number of teaching professors	123
of them, academic degrees are held by	38 (7 D.Sc. + 31 Ph.D.)
Faculties	Mining and Metallurgy Power Industry and Technology of Machine-Building

Currently, the branch has more than 3,000 students in 8 undergraduate and 42 graduate programs.

In 2020 the employees of the branch successfully defended 2 PhD and 1 DSc dissertations.

In the period 2019 to 2020, 4 projects in the following areas are being implemented within the framework of the State Scientific and Technical Programs:

- Development and exploitation of technology for nickel extraction from waste copper production;
- Development of technology for processing zinc cake and clinker generated in zinc production;
- Development of technology for processing copper slag to separate valuable components;
- Development of a technology for obtaining a tungsten middling product with a WO3 content of at least 40% from industrial waste of Scientific and Production Association JSC “Almalyk mining-and-metallurgical integrated works

Also, the staff of the branch prepared 7 project applications for participation in state and international grant programs.

In the period 2019 to 2020, professors and lecturers of the branch published 363 academic papers, including:

- 5 articles in scientific journals included in the databases Scopus, Web of Science;
- 167 articles in other foreign scientific journals;
- 31 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 16 articles in other republican scientific journals;
- 54 abstracts in collections and proceedings of international conferences;
- 77 abstracts in collections and proceedings of national conferences;
- 13 monographs, textbooks, manuals.

In addition, 9 applications for protective documents were submitted as part of the research activities.

5. Scientific Research Institute of Vegetable and Melon Crops and Potato Growing

Uzbek Research Institute of Vegetable and Melon Crops and Potatoes Growing was established on the basis of a decision of the Council of Ministers of the Uzbek SSR dated March 16, 1960 and Order No. 4 dated January 28, 1960 of the Ministry for the Production and Procurement of Agricultural Products on the basis of the Republican Vegetable Experimental Station, organized by order No. 120 of March 3, 1933 USSR People's Commissariat of Agriculture.

By Presidential Decree PP-2125 of February 10, 2014, it was renamed the Research Institute of Vegetables and Melon Crops and Potato Growing.

Director	Rustam Akhrolovich Nizomov, D.Sc., Agriculture
Deputy Director for Research and Innovation	Umidilla Ikramjanovich Akramov, Ph.D., Agriculture
Number of doctoral candidates	13
Number of employees	34
of them, academic degrees are held by	17 (12 D.Sc. + 10 Ph.D.)

In 2020 on the specialty 06.01.06 - Vegetable growing were defended 4 PhD dissertations of Agricultural Sciences

Institute has 7 research laboratories:

- Laboratory “Selection of vegetable and melon crops”;
- Laboratory “Seed Production of Vegetables and Melons Crops”;
- Laboratory “Agro-technology of vegetable crops and potatoes”;
- Laboratory “Vegetable growing in protected areas”;
- Laboratory “Potato Selection and Seed Production”;
- Plant protection laboratory; Laboratory of plants protection against diseases and pests;
- Laboratory of “Agrochemicals and Product Quality”.

As part of research work in the period 2019 to 2020. the Institute signed 41 business agreements for a total of 1,083.6 million UZS.

Currently, research activities are carried out in the following areas:

- Creation of new varieties and hybrids of vegetables, melons crops and potatoes, organization of their primary seed production, development and improvement of cultivation technology, development of measures to protect plants from pests, diseases and weeds, development of measures to obtain environmentally friendly products;
- Development of agro-technical measures in relation to natural-climatic conditions of Uzbekistan, wide use of scientific achievements and best practices;
- Testing for the introduction of new complexes of modern specialized technical means in vegetable growing;
- Supply of specialized seed farms with varietal seeds;
- Advanced training of specialists, specialized vegetable seed production farms of the republic;

- Training of highly qualified scientific personnel;
- Organization of scientific, scientific-practical conferences, meetings and symposiums and seminars for farmers and dehqan farms in the relevant areas of vegetable, melon and potato growing;
- Introducing new scientific developments to farms and dehqan farms, providing them with recommendations and systematic consultations;
- Development of foreign economic, scientific and technical relations, establishment of scientific ties, creation of joint ventures, increasing the efficiency of vegetable production by all types of mediation.

In 2019, 14 projects were implemented within the framework of state scientific and technical programs for a total amount of 2,749.8 mln:

- 1 fundamental project;
- 12 applied projects;
- 1 innovative project.

In 2020, research work was carried out on the basis of 14 fundamental and applied projects at the sum of 3.9 billion UZS. In addition, new applied and innovative projects worth 1.3 billion UZS have been implemented since 2020.

In 2019-2020, the Institute submitted 10 applications to the Ministry of Innovative Development of the Republic of Uzbekistan for participation in state tenders of applied research and innovation projects under the State Program for scientific activities. Of these, 3 projects were positively evaluated by the commission.

Researchers of the Institute in the period 2019 to 2020 published a total of 310 academic papers, including:

- 3 articles in scientific journals included in the databases Scopus, Web of Science;
- 26 articles in other foreign scientific journals;
- 44 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 38 articles in other republican scientific journals;
- 48 theses in collections and proceedings of international conferences;
- 127 theses in collections and proceedings of national conferences;
- 24 monographs, textbooks, manuals.

Also, as part of the ongoing research activities in 2019-2020, 2 patents for plant varieties and 22 certificates of authorship for software products were obtained.

In 2019-2020 24 applications for patenting of new varieties of vegetable, melon crops and potatoes were submitted to the Intellectual Property Agency of the Republic of Uzbekistan. Also 10 varieties of vegetable, melon crops and potatoes were submitted to the Crop Variety Testing Center.

The Institute has a youth policy aimed at supporting young scientists, creating conditions for their fruitful scientific research, finding opportunities for moral and material incentives for young working researchers. Young scientists, as well as senior researchers - applicants, simultaneously work on research projects, which is a tangible incentive in financial support.

The Institute organizes seminars for young scientists, at which their research topics are widely discussed. The Academic Council of the Institute regularly hears the state of execution of theses of senior scientists, researchers, and independent applicants.

The Institute annually accepts young specialists for doctoral studies in 2 specialties:

- 06.01.06 - Vegetable production;
- 06.01.05 - Breeding and seed production.

6. Rice Research Institute

The Rice Research Institute was established in 1930.

Director	Sattarov Masud Akhtamovich, Ph.D. inAgricultural Sciences
Deputy Director for Research and Innovation	Kalandarov Bakhtiyor Iskandarovich, PhD
Number of doctoral candidates	4
Number of employees	21
of them, academic degrees are held by	6 (1 D.Sc. + 5 Ph.D.)

In 2020, an employee of the Institute defended 1 (PhD) dissertation.

The Institute has 5 scientific laboratories:

- Rice breeding laboratory;
- Laboratory of seed production and seed science;
- Laboratory for agricultural technology of rice cultivation;
- Laboratory of selection, seed production, agricultural technologies for the cultivation of leguminous crops;
- Laboratory for plant protection and agrochemistry.

In laboratories for breeding rice and legumes, crosses are carried out annually in 100-120 combinations, using collection varieties with local and foreign varieties of rice, soybeans and mung bean.

Scientists of the Institute have created high-yielding, disease-resistant and pest-resistant rice varieties “UzROS 7-13”, “Avangard”, “Lazurniy”, “Istikbol”, “Istiklol”, “Bugdoi Boshok”, “Ok kiltik”, “Mustakillik”, “ Iskander ”,“ Guljakhon ”,“ Ilgor ”,“ Sitora ”,“ Marvarid ”,“ Navbahor ”,“ Tursunboy ”,“ Ahmad Shali ”,“ Tarona”,“ Tantana ”, “Soybean varieties Uzbekskaya-2”,“Izbekskaya -6”,“Dustlik”,“Nafis”,“Orzu”,“Parvoz ”and varieties of masha“ Kakhrabo ”,“ Navruz ”,“ Radost ”.

2019 rice variety “Tarona” and “Tantana”, soybean varieties “Sevinch” and “Madad” are included in the State Register of Agricultural Crops and patents received.

Agricultural technology for cultivation of rice by seedling methods and a set of measures against weeds, diseases and pests of rice have been developed.

The scientists of the Institute have developed intensive and energy-saving technologies for growing rice in the seedling method, a set of measures for the use of fertilizers, biologically active substances and plant protection products. In addition, scientifically substantiated production dates and rates of sowing varieties of rice and leguminous crops have been developed and recommended, the optimal timing of sowing rice by seedling methods has been determined.

Research work under economic contracts is mainly carried out in the following areas:

- Creation of high-yielding early-, mid- and late-maturing varieties which are resistant to biotic and abiotic stressors, have improved technological quality of grain and high nutritional value of cereals, intended for cultivation in different agro-landscape regions of the Republic on intensive and energy-saving technologies;
- Acceleration of varietal changing and varietal renovation, directed to expansion of assortment of cultivated rice varieties and rice breeding sector efficiency increase;
- Conducting of primary seed production of rice and soybean varieties;
- Definition of optimal norms of seeding seeds, ways and terms of sowing;
- Development and introduction of intensive advanced technology of rice cultivation, which provide rice fields productivity increase and material and labour costs decrease;
- Development and introduction of new technologies and technological methods of fertilizers and other agrochemicals use in rice growing, directed to realization of potential of released sorts of rice taking into account soil-climatic conditions, not breaking ecological balance of environment;
- Development and introduction of system of rice protection from pests, diseases and weeds, which maximally prevent environment pollution and accumulation of residual amount of pesticides in production;
- Creation of new varieties of soybean and mungbean, development and improvement of their cultivation technology;
- Mechanization of rice cultivation and its improvement.

In the period 2019 to 2020, 4 projects are being implemented as part of the State Science and Technology Programs:

- ҚХ-А-ҚХ-2018-51 “Creation of new rows and varieties of high-yield rice, resistant to adverse climatic conditions, based on traditional and non-traditional (by biochemical markers) breeding methods”;
- ҚХ-А-ҚХ-2018-47 “Improvement of means and methods of pest control based on the study of pests in rice cultivation and storage”;
- ҚХ-А-ҚХ-2018-48 “Creation of new varieties of high yielding, resistant to diseases and pests of shade and moss, adapted to main and secondary crops”;
- ҚХ-А-ҚХ-2018-51 “Improvement of irrigation regime, complex fertilizers and growth regulators in the system of continuous rice cultivation and crop rotation”.

At the moment, applications for breeding and agro-technologies of rice and soybeans are being prepared for submission for participation in state grant programs.

Researchers of the Institute in the period 2019 to 2020 published 162 academic papers, including:

- 15 articles in other foreign scientific journals;
- 20 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 19 articles in other republican scientific journals;
- 40 theses in collections and proceedings of international conferences;
- 68 abstracts in the collections and proceedings of national conferences.

Also, as part of the ongoing research activities in the period 2019 to 2020, 4 plant variety patents, 2 certificates of authorship for a software product and 1 application for a patent for a plant variety were received.

7. Research Institute of Horticulture, Viticulture and Winemaking named after M. Mirzaev.

The Research Institute of Horticulture, Viticulture and Winemaking named after Academician M.Mirzaev (formerly named after R.R.Schroeder - 1867-1944) was organized in 1898 on the basis of the Turkestan Agricultural Experimental Station.

The Turkestan Agricultural Experimental Station conducted research besides horticulture, viticulture, cotton growing, vegetable growing, bast crops, rice, wheat and fodder crops. On the basis of the work carried out at the station were created new scientific organizations, branch experimental stations, over time they became Institutes.

Director	Prof. Yuldash Bekmirzaevich Saimnazarov, D.Sc. in Biological Sciences
Deputy Director for Research and Innovation	Obidzhanov Dilshod Akhmedhuja ugli, Ph.D. in Agriculture
Number of doctoral candidates	8
Number of employees	71
of them, academic degrees are held by	19 (3 D.Sc. + 16 Ph.D.)

In 2020, researchers of the Institute successfully defended 6 (PhD) dissertations.

In 2019-2020, the Institute concluded 43 economic contracts.

Research work is carried out in the following areas:

- Breeding and varietal study of fruit, berry crops and grapes;
- Nursery;

- Development of scientific and practical bases of production and improvement of agro-technology of cultivation of newly created varieties.

More than 43 economic contracts were concluded in 2019-2020.

In 2020 within the framework of the State scientific and technical programs 9 scientific projects were executed, of which:

- 1 fundamental;
- 8 applied projects.

Scientific staff of the Institute in the period 2019 to 2020 published a total of 623 academic papers, including:

- 14 articles in scientific journals included in the databases Scopus, Web of Science;
- 56 articles in other foreign scientific journals;
- 176 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 230 articles in other republican journals;
- 44 theses in collections and proceedings of international conferences;
- 96 abstracts in the collections and proceedings of national conferences;
- 7 monographs, textbooks, manuals.

Also, in the period 2019 to 2020, within the framework of ongoing research activities, 8 documents of protection were obtained:

- 3 utility model patent;
- 5 patents for plant variety.

8. Scientific Research Institute of Livestock Breeding and Poultry Farming

The Research Institute of Livestock Breeding was established in 1939. In accordance with ResolutionNº PP-2125 of the President of the Republic of Uzbekistan dated February 10, 2014 was renamed to the Research Institute of Livestock breeding and Poultry farming .

Director	Azamzhon Akbarovich Nurmatov, Ph.D. in Agricultural Sciences.
Deputy Director for Research and Innovation	Bahram Davletbaevich Allashov, Ph.D. in Agricultural Sciences
Number of doctoral candidates	8
Number of employees	13

of them, academic degrees are held by	13 (3 D.Sc. + 10 Ph.D.)

In 2020, the staff of the Institute defended 2 candidate (PhD) dissertations.

In the period 2019 to 2020 within the framework of the State Scientific and Technical Programs, projects are being implemented in the following areas of Livestock breeding, poultry farming and fodder production.

The Institute concluded 10 economic contracts in 2019-2020.

At present, the researchers of the Institute are implementing 10 applied and 1 innovative projects, more than 10 project applications for participation in state and 5 - in international grant programs have been submitted.

Researchers of the Institute in the period 2019 to 2020 published 310 academic papers, including:

- 47 articles in scientific journals included in the databases Scopus, Web of Science;
- 6 articles in other foreign scientific journals;
- 8 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 20 articles in other republican scientific journals;
- 12 theses in collections and proceedings of international conferences;
- 5 theses in collections and proceedings of national conferences;
- 2 monographs, study guides, textbooks, manuals.

Also, as part of the ongoing research activities in the period 2019 to 2020, 4 patents were obtained for a plant variety and 1 application for a patent for an animal breed was filed.

9. Research Institute of Fish Farming

In accordance with Resolution No. PP-2939 of the President of the Republic of Uzbekistan *On measures to improve the fish industry management system* dated May 1, 2017. Scientific and experimental station for the development of fish farming was transformed into the Research Institute of Fish Farming (RIFF).

Director	Abdulla Rukhullaevich Kurbanov, PhD
Deputy Director for Research and Innovation	-
Number of doctoral candidates	1
Number of employees	34
of them, academic degrees are held by	5 (2 D.Sc. + 3 Ph.D.)

Currently, the university has about 4 students, 3 undergraduates and 1 doctoral student.

The Institute carries out its activities scientific laboratories in the following areas:

- laboratory of new technologies in aquaculture;
- laboratory of fish farming in natural lakes;
- laboratory for selection and breeding of fish;
- laboratory of fish feed and feeding;
- laboratory of ichthyopathology.

Currently, research activities are carried out in the following areas:

1. Acclimatization of promising valuable fish species (Siberian sturgeon (Acipenser baerii); African catfish (Clarias garipinus));
2. Preservation and improvement of pond fish gene pool by methods of selection and breeding work in order to create new highly productive mother flocks of herbivorous fish;
3. Improvement of biological productivity and organization of fishery on Aydar-Arnasay system of lakes;
4. Implementation of design works on development of experimental-innovative samples of fish-farming equipment and their industrial release.

In 2019-2020, the Institute concluded 80 economic contracts for a total amount of 2.2 billion UZS.

In 2020, within the framework of the State scientific and technical programs 3 scientific projects were implemented, of which:

- 1 innovative;
- 2 applied projects.

In addition, the university submitted two applications for participation in state grant programs.

Professors and lecturers of the university in the period 2019 to 2020 published 254 academic papers, including:

- 6 articles in scientific journals included in the databases Scopus, Web of Science;
- 6 articles in other foreign scientific journals;
- 7 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 5 articles in other republican scientific journals;
- 6 theses in collections and proceedings of international conferences;
- 18 theses in collections and proceedings of national conferences;
- 1 monograph;
- 2 methodical manuals;
- 1 manual;
- 5 recommendations.

In addition, as part of research activities were obtained 2 copyright certificates for software product. And also 2 applications for a copyright document for works of authorship such as:

- Mobile unit for aeration of water reservoir;
- Cultivation of fish stocking material of carps in pond polyculture using soy milk.

In order to ensure the integration of science, Research Institute of Fish Farming has established cooperation with institutions of higher education. In particular, institutions of higher education are involved in the process of teaching students at the Department of Fish Farming at Tashkent State Agrarian University. University professors are also involved in projects implemented at the Research Institute of Fish Farming. University students do field practice at the Research Institute of Fish Farming and collect necessary information for their diploma works, using the existing teaching aids at the Institute.

In addition to training students, RIFF organized training courses for farmers. These training courses included various seminars for farmers on fish farm organization, feeding, artificial insemination and other technological processes in fish farming.

10. Research Institute of Agricultural Mechanization

The Institute was founded in 1932. By Resolution PP-2125 of the President of the Republic of Uzbekistan dated February 10, 2014 *On improving the activities of the Uzbek Scientific and Production Center of Agriculture*, by orders of the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan No. 33 dated February 13, 2014 and Uzbek Research and Production Center of Agriculture No. 6 dated February 14, 2014, again passed state registration. By the Decree of the President of the Republic of Uzbekistan ПУ-5708 dated April 17, 2019 and the Resolution ПП-42-49 dated April 17, 2019, the Scientific Research Institute of Agricultural Mechanization was introduced into the Scientific and Production Center for Agriculture and Food Supply under the Ministry of Agriculture.

Director	Botir Vohidovich Khushvaktov, PhD in Technical Sciences
Deputy Director for Research and Innovation	Prof. Mahammad Tojalievich Toshboltaev, D.Sc. in Engineering
Number of doctoral candidates	13
Number of employees	48
of them, academic degrees are held by	25 (6 D.Sc. + 19 Ph.D.)

In 2020. 8 researchers of the Institute defended Candidate's dissertations.

The Institute has 10 research laboratories:

- Laboratory of mechanization of tillage and seeding;
- Laboratory of mechanization of cultivation and protection of crops;
- Laboratory of harvesting machines;
- Laboratory of mechanization of horticulture and vegetable growing;
- Laboratory of machine-technology system and operation of machine-tractor fleet;
- Laboratory of means of mobile power engineering;
- Laboratory of resource-saving and automation of technological processes;

- Laboratory of program management and mechatronics;
- Laboratory of mechanization of rain-fed lands and desert pastures;
- Laboratory of livestock mechanization.

Currently, research activities are conducted in the following areas:

1. Development of new types of efficient, high-yield resource and energy-saving agricultural machinery, improvement of existing machine technologies, performance of fundamental and applied research, as well as innovative developments for their implementation in production;
2. Development of targeted programs for further development of mechanization industry, tractors, combines, agricultural and reclamation machines and machine technologies, electrification and automation of agriculture, initial requirements and other regulatory documents for modern tractors, combines, agricultural and reclamation machines that meet the world standards;
3. Electrification and automation of stationary and mobile processes in storage and processing of agricultural and livestock products, development of technical means and methods for the effective use of renewable and alternative energy sources and technologies;
4. Conducting adaptation tests of modern tractors, combines, agricultural and reclamation machinery and mechanical technologies imported into Uzbekistan, development of scientifically based recommendations on efficiency evaluation, as well as on their adaptation to Uzbek conditions and their introduction into production;
5. Deepening the integration of science, education and production in the field of mechanization, electrification and automation of agriculture, systematic training of highly qualified scientific and pedagogical staff, improving the quality of education of relevant universities, active participation in the preparation of erudite bachelors and masters.

In 2019, 19 projects were implemented as part of state scientific and technical programs, including:

- 2 fundamental project;
- 10 applied projects;
- 4 innovation project;
- 1 international project;
- 2 pilot projects.

Researchers of the Institute in the period 2019 to 2020 published 420 academic papers, including:

- 28 articles in scientific journals included in the databases Scopus, Web of Science;
- 42 articles in other foreign scientific journals;
- 64 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 10 articles in other republican scientific journals;
- 95 theses in collections and proceedings of international conferences;
- 175 abstracts in the collections and proceedings of national conferences;
- 6 monographs, textbooks, manuals.

Also as part of the ongoing research activities in 2019-2020 received 4 patents for utility model and 1 patent for invention. In addition, 25 applications for protective documents were prepared and submitted.

The Institute also pursues a policy of young scientists, which consists of:

- attracting talented masters and young researchers to scientific activities;
- accepting worthy young people for doctoral studies;
- creating the necessary conditions for scientific research;
- providing financial and spiritual support;
- introduction of young scientists in fundamental, applied and innovative projects as executors.

The Institute organizes training seminars for young scientists. The research topics of young scientists are approved by decision of the Scientific and Technical Council. The Scientific and Technical Council of the Institute regularly discusses the research of doctoral students and young scientists and gives appropriate recommendations. Young scientists are provided with methodological and financial support for the publication of their research results in authoritative foreign publications.

11. Research Institute of Forestry

The Research Institute of Forestry was reorganized under the State Forestry Committee of the Republic of Uzbekistan in accordance with Resolution No. 2966 of the President of the Republic of Uzbekistan dated May 11, 2017.

Director	Prof. Abdushukur Khudoikulovich Khamzaev, D.Sc. in Agricultural Sciences,
Deputy Director for Research and Innovation	Otabek Temirovich Khujaev, Ph.D. inAgricultural Sciences
Number of doctoral candidates	11
Number of employees	52
of them, academic degrees are held by	14 (4 D.Sc. + 10 Ph.D.)

In 2020, 2 researchers of the Institute defended doctoral dissertations.

There are 7 research lab oratories at the Institute:

- Laboratory of forest soil science and agrochemistry;
- Laboratory of Selection, Seed Production and Nursery;
- Laboratory of protective afforestation and forest reclamation;
- Laboratory of mechanization of reforestation activities;
- Laboratory of medicinal plants cultivation;
- Laboratory of forest protection;
- Laboratory “in-vitro”.

Currently, research activities are conducted in the following areas:

1. Improving the condition of naturally growing forests, increasing their ameliorative, water-protective, water-regulating and soil-protective role and productivity;
2. Forest reclamation improvement of soil water balance, land-erosion and mudflows control, and increasing productivity of mountain areas of Uzbekistan by establishing valuable forest, nut and fruit plantations on mountain slopes and reclamation improvement of mountain pastures;
3. Fixing and afforestation of mobile sands, protection of agricultural lands, irrigation systems, gas pipelines and settlements from sand drifts, increasing productivity of desert pastures by forest reclamation methods;
4. Forest-reclamation development of the dried bottom of the Aral Sea in order to improve the environmental situation of the Aral Sea region and its adjacent territories, as well as the involvement of these territories in economic turnover;
5. Development of methods of sustainable and rational forestry in Uzbekistan;
6. Development of methods and technologies for creation of forest crops to restore forests and create protective plantations in mountain, desert zones and irrigated lands;
7. Development of scientific foundations and promising technologies for growing planting material of valuable forest and ornamental trees and shrubs;
8. Providing scientific, methodological and production assistance to various economic entities in the cultivation of ornamental plants;
9. Selection of main forest-forming species, introduction of new species and varieties (forms) of woody plants, breeding of fast-growing, highly productive and resistant to pests and diseases varieties of nut-bearing, elm, poplar and ornamental plants;
10. Research in the field of seed production of major forest-forming and ornamental species, development of scientific bases and technologies of creation of forest seed plantations of major forest-forming species;
11. Organization of research in the field of biological and integrated methods of plant protection from pests and diseases, application of low toxic and highly effective compounds safe for humans and the environment and obtaining environmentally safe products;
12. Improvement of efficiency of forest reclamation and forestry works through development and manufacture of specialized forestry machines and tools for mechanization of works in mountains, deserts and irrigated zone;
13. Modernization of existing specialized forestry machines and tools;
14. Development and maintenance of machinery system for forestry and protective afforestation.

In the period 2019 to 2020, the Institute implemented 13 scientific projects, including 9 applied and 4 innovative projects. The Institute submitted 5 scientific project applications to the State Scientific and Technical and Targeted Pomegranate Project Competitions.

Researchers of the Institute in the period 2019 to 2020 published a total of 292 academic papers, including:

- 16 articles in scientific journals included in the databases Scopus, Web of Science;
- 40 articles in other foreign scientific journals;
- 76 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 56 articles in other republican scientific journals;

- 38 theses in collections and proceedings of international conferences;
- 56 theses in collections and proceedings of national conferences;
- 10 monographs, textbooks, manuals.

Also, as part of the ongoing research activities in 2019-2020, 2 patents for invention and 13 patents for plant variety were obtained. In 2019-2020, the Institute submitted 15 applications to the Intellectual Property Agency under the Ministry of Justice of the Republic of Uzbekistan for obtaining patent certificates for scientific inventions.

12. Institute of Genetics and Plant Experimental Biology.

Institute of Genetics was established by Resolution No. 337 of the Cabinet of Ministers dated July 21, 1992. On 13 February 1997, by merging the Institute of Genetics and the Institute of Experimental Biology of Plants by Resolution 4-23 of the Presidium of the Republic of Uzbekistan was established Institute of Genetics and Experimental Biology of Plants at the Academy of Sciences of Uzbekistan.

Director	Ilham Dzhumanazarovich Kurbanbaev D.Sc. in Biological Sciences
Deputy Director for Research and Innovation	Acting Deputy Director Saidmurot Kimsanbaevich Baboev, D.Sc. in Biological Sciences
Number of doctoral candidates	14
Number of employees	45
of them, academic degrees are held by	45 (15 DSc. + 30 PhD.)

In 2020 the researchers of the Institute successfully defended 5 (PhD) and 2 (DSc) doctoral dissertations.

Institute has the following research laboratories:

- Laboratory of Genetics, Selection and Seed Production of Cotton;
- Laboratory of Genetics, Breeding and Seed Production of Legumes, Oilseeds and Medicinal Plants;
- Laboratory of Seed Science;
- Laboratory of Ecological Genetics and Plant Physiology;
- Laboratory of Biology and Technology of fiber and seeds of industrial crops;
- Laboratory of Molecular and Biochemical Genetics;
- Laboratory of Biotechnology and Nanotechnology;
- Laboratory of Genetics, Selection and Seed Production of Grain Crops;
- Laboratory of Experimental Polyploidy and Phylogeny of Cotton.

Currently, research activities are carried out in the following areas:

- Development of new scientific directions, innovative approaches and proposals for implementation of scientific results in economic sectors;

- Conducting research in priority areas of genetics, physiology, biochemistry, molecular biology, plant breeding, seed breeding and seed science, development of new methods of creating varieties based on methods of classical and modern methods of genetics;
- Study and enrichment of the collection of biodiversity of the genus Gossypium L;
- Study of genetic patterns of inheritance of adaptive responses, epigenetic and morphophysiological features of adaptation, search for ways to increase resistance of agricultural crops;
- Development of biotechnology production methods for crops, medicinal and phytomeliorative plants and their application in practice;
- Development of new effective methods of producing original and hybrid F1 seeds;
- Development of new bio and nano materials of microbial origin to improve soil fertility and increase crop productivity;
- Phytopathological and molecular diagnostics of diseases, development of methods of prevention and treatment of diseases in crops;
- Application and commercialization of research results and innovative developments in production.

Institute has concluded contracts with the following agro-clusters for testing and expansion of cultivated areas of cotton varieties:

- “BEK CLUSTER” Syrdarya region;
- “Fergana-Aseana Textile” Fergana region;
- “KOBOTEX”Khorezm region;
- “Indorama” Kashkadarya region.

In 2020, within the framework of the State Scientific and Technical Programs, 16 scientific projects were completed, of which:

- 3 fundamental;
- 12 applied;
- 1 project of young scientists.

In addition, the university has submitted 4 applications for participation in state grant programs and 3 applications for participation in a joint (India-Uzbekistan) research project.

In the period 2019 to 2020, professors and teachers of the university published 325 academic papers, of which:

- 41 articles in scientific journals included in the databases Scopus, Web of Science;
- 33 articles in other foreign scientific journals;
- 57 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 34 articles in other republican scientific journals;
- 37 theses in collections and proceedings of international conferences;
- 116 abstracts in the collections and proceedings of national conferences;
- 7 monographs, study guides, textbooks, manuals, etc.

In addition, as part of the research activities were obtained 11 patents on the plant variety. As well as 18 applications for protective documents were filed.

13. Center for Genomics and Bioinformatics

The Center was established in 2012 in accordance with Joint Order No. 10/2.70.49 of the Academy of Sciences, the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan and Association "Uzpakhtasanoat" dated April 18, 2012 as an interdepartmental scientific institution under the Academy of Sciences of the Republic of Uzbekistan, the Ministry of agriculture and water economy and Association "Uzpakhtasanoat". According to the Decree of the President of the Republic, Uzbekistan PP - 2769 of February 10, 2017 *On additional measures for the development of fundamental and applied research, as well as innovative work in the field of genomics and bioinformatics*, the Center was reorganized as a scientific institution under the Academy of Sciences of the Republic of Uzbekistan.

Director	Academician Ibrokhim Yulchievich Abdurakhmonov, D.Sc. in Biological Sciences
Deputy Director for Research and Innovation	Zabardast Tozhibaevich Buriev, D.Sc. in Biological Sciences
Number of doctoral candidates	7
Number of employees	51
of them, academic degrees are held by	18 (5 DSc. + 13 PhD.)

The Institute has the following research laboratories:

- Laboratory of structural and functional genomics;
- Laboratory of transgenomics and tissue culture;
- Laboratory of plant resistance genomics;
- Laboratory of proteomics and plant metabolomics;
- Bioinformatics laboratory;
- Marker-associated selection laboratory.

Institute has the following research laboratories:

- Laboratory of structural and functional genomics;
- Laboratory of transgenomics and tissue culture;
- Laboratory of plant resistance genomics;
- Laboratory of proteomics and plant metabolomics;
- Bioinformatics laboratory;
- Marker-associated selection laboratory.

In 2019-2020 the Institute concluded 23 economic contracts for a total amount of 218 million UZS.

Currently, research activities are carried out in the following areas:

- Genomics and bioinformatics;
- Proteomics and metabolomics;
- Genetic engineering;
- Marker-associated plant selection.

In 2020, 4 fundamental, 7 applied, 1 innovative and 1 youth projects dedicated to study of cotton genome, transcriptome and proteome, genetic diversity of grapes and development of new biotechnological varieties of cotton were implemented under the State Scientific and Technical Programs.

In addition, 1 international grant to study Fusarium wilt of cotton has been implemented since 2019. The project is funded by the US Department of Agriculture.
In 2019-2020, 9 applied, 4 fundamental and 1 international projects dedicated to cotton genome research, creation of abiotic stress-resistant biotechnological varieties of cotton, in vitro microclonal multiplication of medicinal plants and grapes were submitted for participation in the tenders of the Ministry of Innovative Development of the Republic of Uzbekistan.

Professors and lecturers of the university in the period 2019 to 2020 published a total of 272 academic papers, including:

- 1 articles in scientific journals included in the databases Scopus, Web of Science;
- 23 articles in other foreign scientific journals;
- 42 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 7 articles in other republican scientific journals;
- 62 theses in collections and proceedings of international conferences;
- 132 abstracts in the collections and proceedings of the national conferences;
- 5 monographs, study guides, textbooks, manuals, etc.

In addition, as part of the research activities were obtained 4 protective documents, of which:

- 2 patents for invention;
- 2 patents for a plant variety/animal breed.

In 2019-2020, the Intellectual Property Agency of the Republic of Uzbekistan filed:

- 2 applications for cotton varieties;
- 1 application for a variety of wheat;
- 1 application for a variety of potatoes;
- 1 application for an invention;
- 1 application for a software product.

14. Research Institute of Selection, Seed Production and Agrotechnology of Cotton Cultivation

Research Institute of Selection, Seed Production and Agrotechnology of Cotton Cultivation, was established in accordance with Resolution No. PP-2125 of the President of the Republic of Uzbekistan dated February 10, 2014 on the basis of Uzbek Research Institute of Selection and Seed Production of Cotton, Uzbek Research Institute of Cotton and Republican Station of Primary Seed Production and Crop Seed Science.

Director	A'zam Erkinovich Ravshanov, D.Sc. in Agricultural Sciences
Deputy Director for Research and Innovation	Prof. Fatullo Jurakulovich Teshaev, D.Sc. in Agricultural Sciences
Number of doctoral candidates	35
Number of employees	64
of them academic degrees are held by	64 (21 DSc. + 43 PhD.)

In 2020 the research staff of the Institute successfully defended 10 (PhD) and 4 (DSc) doctoral dissertations.

The Institute has 19 research laboratories.

In the period 2019 to 2020, 41 economic contracts were concluded for a total amount of 2.3006 billion UZS.

Currently, research activities are carried out in the following areas:

a) On selection and seed production:

1. Organization and implementation of the main topical direction of genetics, breeding and seed production of cotton and alfalfa, improvement and publications on the development of new proposals for breeding, seed production and seed science, as well as on the scientific activities of the Institute;
2. Provision of methodological services in academic papers of research institutions, higher educational institutions, participation in approbation of research works, as well as joint research of theoretical, scientific and practical and innovative projects;
3. Centralized evaluation of elite seed material, to determine the technological quality of fiber to use modern equipment, as well as control for proper sampling of new, promising and zoned cotton varieties;
4. Use of cotton collection samples and individual selections, creation of varieties, to have copyright, transfer to GSI for testing, as well as transfer to the Intellectual Property Agency for obtaining a patent;
5. Carrying out author's supervision in elite-seed farms, as well as control of carried out works according to the existing instructions;
6. Provision of elite seed production farms with original and elite seeds of released and promising cotton varieties on the basis of the contract, which are stocked at the Institute and its research and experimental stations.

7. Advanced training and participation in carrying out certification of staff, approvers and field agronomists of primary and elite farms;
8. Carrying out of author supervision on estimation of quality of seed materials, using of standards on conservation and processing of seed stock;
9. Participation in the International Seed Quality Control Association.

b) On the agro-technologies of cotton growing:

1. improvement of land reclamation state, development and implementation of scientific and practical bases of reconstruction, as well as advanced methods and resource-saving irrigation technologies;
2. Development of crop rotations that ensure restoration, preservation and improvement of soil fertility;
3. Development and implementation of resource-saving agro-technologies on use of organomineral fertilizers, efficient use of land and water resources;
4. Testing and participation in drawing up technological charts of new machinery for the use of agricultural production in irrigated areas;
5. Studying the efficiency of non-traditional agro-roots use for cotton and related crops cultivation;
6. Testing and developing recommendations for the use of herbicides, defoliants and stimulants in cotton growing;
7. Creation and implementation of advanced agro-technologies in agriculture and water management, testing of high capacity agricultural machinery and mechanisms;
8. Development of agro-technology for growing of new and promising varieties of cotton and transfer of practical recommendations to farms;
9. In the field of science and technology introduction, together with the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan, the Scientific-Production Center for Agriculture and Food of the Academy of Sciences of the Republic of Uzbekistan and other institutions to develop a scientifically justified program for placement of new crop varieties, taking into account soil and climatic conditions, as well as modern resource-saving technology.

In 2020, 6 fundamental, 42 applied and 2 innovative projects were implemented within the framework of the State scientific and technical programs.

Professors and lecturers of the university in the period 2019 to 2020 published a total of 554 academic papers, including:

- 25 articles in scientific journals included in the databases Scopus, Web of Science;
- 75 articles in other foreign scientific journals;
- 214 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 72 theses in collections and proceedings of international conferences;
- 121 theses in collections and proceedings of national conferences;
- 47 monographs, textbooks, manuals, etc.

In addition, within the framework of research activities 9 documents of protection for the cotton varieties C-6580, C-7306, C-7333, SP-38, SP-2531, SP-7703, SP-8296, Surhon-106, ŬzPITI-202 and one invention “Method of identifying and isolating high-grade seeds from the original seed material” were received”.

TASHKENT REGION

In 2019-2020, 30 applications for protection documents were submitted to the Intellectual Property Agency of the Republic of Uzbekistan.

In 2019, the Memorandum of Cooperation between the Institute of Technical Crops of Xinjiang Academy of Agricultural Sciences of the PRC and the Scientific Research Institute of Breeding, Seed Production and Agro-technology of Cotton Cultivation (NIISSAWH) of the Republic of Uzbekistan was drafted and concluded:

- organization and coordination of joint scientific research in the areas of selection, seed production and agricultural technology for growing cotton;
- joint preparation and publication of scientific articles on sectoral areas of genetics, selection, seed production and agricultural technology of cotton;
- training and professional development of researchers between the two countries.

In 2020, organized at the Institute “Uzbek-Chinese Joint Laboratory for Biotechnology”, which is equipped with modern equipment in the amount of 500 thousand US dollars.

REPUBLIC OF KARAKALPAKSTAN

Administrative center	Nukus
Administrative divisions	15 districts
Khokim	Murat Kallibekovich Kamalov
Area	166 600 km² (ranked 1st)
Population	1 909 900 people (ranked 9th)
Largest cities	Nukus, Turtkul, Amu Daryo
GRP volume	18 735.7 billion UZS (ranked 11th)
GRP structure	Agriculture, forestry and fisheries – 27.3% Industry – 31% Construction – 8.4% Trade and services – 33%
The key indicators of Development of the Scientific and Technological Potential and innovations in the Republic of Karakalpakstan in 2019 (according to the Bulletin of the State Statistics Committee of the Republic of Uzbekistan)	
Number of tertiary education institutions	9
Number of institutions with a postgraduate education system	5
Number of doctoral/postdoctoral students	104
Number of PhD/D.Sc. applicants graduated	14/1
Number of institutions engaged in R&D	9
Size of R&D financing	9 989.5 million UZS
Number of employees engaged in R&D	308
Number of implemented technological innovations	65
Number of new technologies acquired by institutions	2

Background

After the collapse of the USSR and the independence of Uzbekistan, Karakalpakstan became part of the Republic of Uzbekistan, the successor of the Uzbek SSR. Like Uzbekistan, after 31 August 1991 Karakalpakstan changed its name from Karakalpak ASSR to the Republic of Karakalpakstan, remaining within Uzbekistan, but in fact having relative autonomy over its affairs from Uzbekistan until January 1993. The highest legislative body of the republic was the Supreme Council of the Republic of Karakalpakstan, while the highest executive body was the Council of Ministers of the Republic of Karakalpakstan.

According to historical sources, people lived on the territory of Karakalpakstan as early as the Neolithic period. The territory of the modern Republic of Karakalpakstan is a kind of “archaeological reserve”, which now has more than 300 archaeological sites. In ancient times this territory together with modern Khorezm region and adjacent districts of Turkmenistan constituted Khorezm.

Region's Economy

The Republic of Karakalpakstan possesses large natural, mineral and agricultural resources, labor potential, road, transport and engineering-communication networks, industrial infrastructure, a convenient geographical location and a large territory.

Agriculture occupies an important place in the economy of the Republic of Karakalpakstan. The main branches of agriculture in Karakalpakstan are grain farming, namely, production of wheat and raw rice, as well as cotton growing, cattle breeding, silkworm breeding, industry and construction.

Currently, the development of Tebinbulak deposit, which has huge reserves of iron ore - 2 billion tons, is continuing. The annual production capacity of the processing complex is 1 million tons of steel products per year, of which 35% are planned to be exported.

The Ustyurt Gas Chemical Complex (UGCC), one of the largest oil and gas projects in the world, began operations in 2016.

Nukus, the administrative center of the Republic of Karakalpakstan, has wineries, textile factories, metal factories, factories producing household appliances and electronics, repair and mechanical plants, as well as mini dairy plants.

In accordance with the program developed after the visit of President of the Republic of Uzbekistan Sh. Mirziyoyev in January 2020, 242 projects worth about 160 billion UZS were realized aimed at industrial development. This made it possible to create almost 4 thousand jobs.

For example, the first line of “Karakalpakcement” enterprise with production capacity of 200 thousand tons of cement per year was put into operation in Karauzyak district, the enterprise “Technic Global” in Nukus launched production of 150 thousand TV sets under “Samsung” brand, the enterprise “Nukus Polymer” produced 8 thousand tons of polyethylene pipes and household goods. The enterprise “Vegatex Global” of Turtkul district produces 5 thousand tons of yarn per year.

Development of scientific and innovation activities in the region

Scientific and innovative activities in the region are carried out by nine higher educational institutions and four research Institutes.

1. Karakalpak State University named after Berdakh

In September 1935, the first institution of higher education was opened in Karakalpakstan - the Teachers' Institute. In 1944 it was transformed into the Karakalpak State Pedagogical Institute, on the basis of which the Nukus State University (now Karakalpak State University named after Berdakh) was established in September 1976. On August 31, 1976 there was a grand opening of Nukus State University, which was attended by the leaders of Uzbekistan and Karakalpakstan, as well as guests from other republics.

Rector	Prof. Akhmed Mambetkarimovich Reimov, D.Sc. in Engineering
Vice Rector for Research and Innovation	Associate Prof. Izimbet Rakhmetovich Turdymambetov, D.Sc. in Geographical Sciences
Number of students	16,846
Number of teaching professors	746
of them, academic degrees are held by	264 (26 D.Sc. + 238 Ph.D.)
Faculties	1. Physics 2. Mathematics 3. History 4. Biology 5. Geography and Natural Resources 6. Karakalpak Philology and Journalism 7. foreign languages 8. Chemical Technology Faculty 9. Industrial Technology 10. Physical Education 11. Law 12. Uzbek Philology 13. Economics 14. art history 15. Construction 16. Architecture

Currently, the university has almost 17,000 students, 605 graduate students and 45 doctoral students in 48 specialties.

In 2020, research staff of the Institute successfully defended 33 (PhD) theses and 5 (DcS) dissertations.

On the basis of 3 economic contractual works were carried out research works in the amount of 131 million UZS.

In 2020, five project applications on the following topics have been submitted for participation in grant rounds announced by the Ministry of Innovative Development:

- Development and research of numerical methods of increased accuracy for non-stationary nonlinear boundary value problems.
- Creation of innovative multimedia products for legal education clusters in the system of legal education (by the example of the Republic of Karakalpakstan)
- Creation of online platform for explanatory mathematical dictionary in Uzbek, Karakalpak, Russian and English languages.
- Development of resource-saving agro-technology for cultivation of sesame varieties and organization of primary seed production in conditions of soil salinity and water deficit in the Aral Sea region.
- Development of technology for metal enrichment from Ustyurt limestone carbonate rocks in the Republic of Karakalpakstan.

In 2020, within the framework of the State scientific and technical programs, 2 fundamental and 4 applied programs were carried out at a total cost of 1 billion. 185 million 932 thousand UZS.

Professors and lecturers of the university in the period 2019 to 2020 published a total of 4,317 academic papers, including:

- 82 articles in scientific journals included in the databases Scopus, Web of Science;
- 235 articles in other foreign scientific journals;
- 189 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 308 articles in other national scientific journals;
- 1 603 abstracts in collections and proceedings of international conferences;
- 1 793 abstracts in collections and materials of national conferences;
- 107 monographs, textbooks, manuals, etc.

In addition, as part of the research activities were obtained 27 protective documents, including:

- 2 patents for invention;
- 1 patent for an industrial design;
- 24 certificates of authorship for software product.

Since May 2020, the Karakalpak branch of the Institute of Mathematics named after S. I. Romanovsky Academy of Sciences of the Republic of Uzbekistan.

During 2020, the university organized and held 3 international, 9 republican, 12 scientific and practical online conferences.

2. Medical Institute of Karakalpakstan

On February 14, 2020, by the decree of the President of the Republic of Uzbekistan Sh.M. Mirziyoyev, the Nukus branch of the Tashkent Pediatric Medical Institute (TashPMI) was transformed into the Medical Institute of Karakalpakstan.

Rector	Prof. Oral Aminovna Ataniyazova, D.Sc., Medicine
Vice Rector for Research and Innovation	Associate Prof. Gulparshyn Koshkinbaevna Zhiemuratova, Ph.D., Medicine
Number of students	2,047
Number of teaching professors	194
of them, academic degrees are held by	64 (17 D.Sc. + 47 Ph.D.)
Faculties	1. General Medicine and Traditional Medicine 2. Pediatric, higher nursing and medical and biological faculty 3. Dental and medical-preventive and pharmaceutical faculty

Currently, the university has more than 2,000 students, 12 master's students in 8 areas of specialties.

In the framework of the annual International Week of Innovative Ideas (InnoWeek 2020) 10 startup projects of the Institute's students participated in 2020. Of these, such projects as “Children of the Sun” and “Cycling Nukus City” were funded for more than 1,000 USD each.

Professors and lecturers of the university in the period 2019 to 2020 published 208 academic papers, including:

- 33 articles in scientific journals included in the databases Scopus, Web of Science;
- 55 articles in other foreign scientific journals;
- 27 articles in national scientific journals, reviewed by State Commission for Academic Degrees and Titles;
- 48 articles in other republican scientific journals;
- 11 theses in collections and proceedings of international conferences;
- 32 theses in collections and proceedings of national conferences;
- 2 monographs.

In addition, according to the Presidential Order of May 22, 2017. *On measures to strengthen the material and technical base of the Nukus branch of the TashPMI*” (construction of a 120-bed clinic for the NB PMI), the International Innovative Clinic for the treatment of congenital anomalies and chronic pathologies in children was built. According to the Presidential Decree of November 11, 2020. “Paragraph 13b, on measures for the comprehensive social and economic development of the Republic of Karakalpakstan in 2020-2023, provided for the establishment of an environmental and human health research and training center at the Medical Institute of Karakalpakstan. Joint advanced training courses for physicians with medical universities of Germany, Ukraine, Israel, Russia, Korea, etc. were created.

3. Nukus State Pedagogical University named after Ajiniyaz

The history of Nukus State Pedagogical Institute dates back to 1934, when a higher education institution aimed at training specialists for the system of public education was first opened in the city of Turtkul, the former capital of Karakalpakstan. Since its opening, the Institute has gone through several stages of development. It began to exist as the Turtkul State Teacher Training Institute, and later, after its dislocation in the city of Nukus, it was renamed the Karakalpak State Pedagogical Institute. In this status the school functioned until the mid-1970s, and in 1976 it was awarded the status of Nukus State University, and later, in the early 1990s, the Karakalpak State University named after Berdakh.

Rector	Associate Prof. Bayram Perdebaevich Otemuratov, D.Sc, Mathematics and Physics
Vice rector for Research and Innovations	Polatbek Jumabaevich Kalkhanov, PhD
Number of students	14,327
Number of teaching professors	524
Of them, academic degrees are held by	166 (21 D.Sc. + 145 Ph.D.)
Faculties	1. Mathematics and Physics 2. Natural Sciences 3. History 4. Pedagogy 5. Arts and Labour Education 6. Turkic languages 7. Foreign Languages 8. Pre-school Education 9. Primary Education 10. Physical Education 11. Ellikalin Faculty of Pedagogy

In 1991, with the independence of Uzbekistan, a new approach to training teachers and improving the quality of education began to develop intensively (Law on Education, National Program for the Training of Personnel). In this regard, in the same year the Nukus State Pedagogical Institute (NSPI) was recreated in the capital city of Karakalpakstan, which since 1992 has been named after Azhiniaz, an outstanding thinker of the Aral Sea region of mid XIX century and one of the bright classics of Karakalpak poetry.

At present more than 14,000 students, 368 masters' and 31 doctoral students in 27 specialties are studying at the university.

In 2020 the researchers of the Institute successfully defended 10 (PhD) theses and 4 (DSc) doctoral dissertations. In the period 2019 to 2020, the University professors and lecturers published 3420 reseatch papers, including:

- 22 articles in scientific journals included in the Scopus and Web of Science databases;

- 122 articles in other foreign scientific journals;
- 200 articles in national scientific journals reviewed by the State Commission for Academic degrees and titles;
- 1 284 theses in compendiums and international conference materials;
- 1 592 theses in compendiums and republican conference materials;
- 95 monographs, study guides, textbooks and tutorials.

Moreover, a utility model was patented as part of the research activities.

4. Nukus branch of Tashkent state agrarian university

Agricultural Karakalpak state university hosted Nukus branch of Tashkent State Agrarian University in 2003 as per Resolution No. 269 of the Cabinet of Ministers of the Republic of Uzbekistan.

Director	Prof. Elmurat Sherniyazovich Toreniyazov, D.Sc. in Agriculture
Deputy Director for Research and Innovations	Berdiyar Bakhtiyarovich Jollybekov, PhD in agriculture
Number of students	2,435
Number of teaching professors	158
Of them, academic degrees are held by	72 (14 D.Sc. + 58 Ph.D.)
Faculties	1. Agrobiology 2. Agroengineering and investment 3. Fish and silk farming

Currently there are around 2500 students, 123 undegraduates and 31 postgraduates in 25 different fields of study.

In 2020 university researchers have successfully defended 8 (PhD) candidate theses and 1 (DSc) doctoral thesis.

Five economic contracts were signed in 2019-2020.

Currently the following areas see research activities conducted:

- Development of intensive agro-technologies for growing high-yield crops;
- Creation of new intensive cotton and grain types;
- Pest and disease protection for the agricultural crops;
- Livestock productivity in cattle breeding;

- Introducing new tehcnologies in agricultural production, etc.

Four projects were delivered under the State scientific and technical programs in 2020:

- ҚХ-А-ҚХ-2018-78. “Selection of rice and winter wheat varieties under the natural and climatic conditions of the Republic of Karakalpakstan. Creating highly efficient resource-saving cultivation technologies”;
- ҚХ-А-ҚХ-2018-80. “Creation of high-yield winter wheat varieties with high grain quality, resistant to environmental stress factors of the Republic of Karakalpakstan”;
- КХ-А-КХ-2018-81. “Primary post-cultivation and harvesting technology for the new quinoa crop”;
- ҚХ-А-ҚХ-2018-73 “Improvement and introduction of elite KK-60 sunflower seeds in the Aral Sea region”.

Professors and students have published 256 academic papers in the period 2019 to 2020, of which:

- 19 articles in scientific journals included in the Scopus and Web of Science databases;
- 21 articles in other foreign scientific journals;
- 17 articles in national scientific journals reviewed by the State Commission for Academic degrees and titles;
- 35 articles in other foreign scientific journals;
- 38 theses in compendiums and international conference materials;
- 95 theses in compendiums and republican conference materials;
- 30 monographs, study guides, textbooks and tutorials, etc.

4 copyroght documents have also been developed as part of research, namely:

- 1 utility model patent;
- 2 invention patents;
- 1 plant patent.

3 requests were submitted for the copyright model, namely:

- 2 requests for the useful model;
- 1 request for invention.

As part of international cooperation, the branch has made contact with leading foreign universities and research centers. As follow up to cooperation 32 memorandums and contacts in different agricultural areas have been signed.

The following projects are being implemented at the moment:

- ICBA – Fodder crop production;
- Chiba University (Japan) – Saline soil microbiology studies;
- Showa medical university – Medical plant studies; development of cultivation methods;
- OYO (Japan) – Combating land desertification;
- Erasmus + UZVET – Combined veterinary network training in RUz.

5. Nucus branch of Uzbek State University of Physical Culture and Sports

Founded in accordance with Resolution No. 924 of the Cabinet of Ministers of November 13, 2018. “Foundation of the Nucus branch of Uzbek State University of Physical Culture and Sports”.

Director	Bayram Jaksymuratovich Mambetov, Ph.D. in History
Deputy Director for Research and Innovations	Makhsetbey Zinatdin uly Aytymbetov, PhD
Number of students	614
Number of teaching professors	17
Of them, academic degrees are held bys	9 (9 Ph.D.)
Faculty	1. Sports

Currently there are more than 600 students in 11 different fields of study at the university.

A “Immunity against bad habits through the widespread PT propaganda” project was delivered in 2020 under the Scientific and technical programs.

Professors and students have published 27 academic papers in the period 2019 to 2020, including:

- 2 articles in scientific journals included in the Scopus and Web of Science databases;
- 4 articles in other foreign magazines;
- 2 articles in national scientific journals reviewed by the State Commission for Academic degrees and titles;
- 5 theses in compendiums and international conference materials;
- 10 theses in compendiums and republican conference materials;
- 4 monographs, study guides, textbooks and tutorials, etc.

“The role of PT and sports in healthy lifestyle” project is expected to be delivered in future. Project goal: implementation of science-based measures aimed at formation and development of immunity to harmful habits through cultural organization of leisure activities in cities and remote rural areas of the Republic of Karakalpakstan, wide involvement of children, youth and women in physical culture and sports.

6. Nucus branch of Tashkent university of Information Technology bamed after Mukhammad al-Khorazmiy

The branch was founded in accordance with Resolution No. PP-91 of the President of the republic of Uzbekistan dated June 2, 2005

Director	Prof. Batyrbek Tulepbergenovich Kaipbergenov, D.Sc. in Engineering
Deputy Director for Research and Innovations	Bakbergen Sharibaevich Aytmuratov, Ph.D. in Engineering
Number of students	1,581
Number of teaching professors	98
Of them, academic degrees are held by	30 (8 D.Sc. + 22 Ph.D.)
Faculties	1. Computing engineering 2. Telecommunications and professional training

Currently there are more than 1500 students in 5 different fields of study at the university.

A scientific research is being conducted in the following fields:

- Computing systems;
- Telecommunications;
- Mathematical modelling.

One innovative project is being conducted as part of the State scientific and technical programs.

Professors and students have published 396 academic papers in the period 2019 to 2020 of which:

- 8 articles in scientific journals included in the Scopus and Web of Science databases;
- 24 articles in other foreign magazines;
- 42 articles in national scientific journals reviewed by the State Commission for Academic degrees and titles;
- 33 articles in other republican magazines;
- 62 theses in compendiums and international conference materials;
- 205 theses in compendiums and republican conference materials;
- 22 monographs, study guides, textbooks and tutorials, etc.

Moreover, 12 copyrights for the sofrware product were received as part of the research activities.

The branch has a scientific council for mathematical modeling. A scientic council on “Mathematical and software provision of computers and computing devices” is expected to be opened in 2021.

7. Nucus branch of the State University of Arts and Culture of Uzbekistan

Nucus branch of the State university of Arts and culture of Uzbekistan was founded under the decree of the first president of RUz ПП-845 dd. April 28 2008.

Director	Jenisbay Ungarbaevich Shaniyazov, Ph.D. in Philology
Deputy Director for Research and Innovations	Nuratdin Shamshetdinovich Khamidov, Ph.D. in Philology
Number of students	587
Number of teaching professors	11
of them, academic degrees are held by	2 (2 Ph.D.)
Faculty	1. History of Art

Currently there are around 600 students in 5 different fields of study at the university.

A scientific research is being conducted in the following fields:

- Musical Drama;
- Drama actor;
- Vocal performance;
- National music performer;
- Film director;
- Art study;
- Head of Arts and Culture department.

Professors and students have published 103 academic papers in the period 2019 to 2020 of which:

- 6 articles in scientific journals included in the Scopus and Web of Science databases;
- 10 articles in other foreign magazines;
- 8 articles in national scientific journals reviewed by the State Commission for Academic degrees and titles;
- 20 articles in other republican magazines;
- 10 theses in compendiums and international conference materials;
- 35 theses in compendiums and republican conference materials;
- 14 monographs, study guides, textbooks and tutorials, etc.

8. Nucus branch of Navoi State Institute of Mining

Founded as per Resolution of Cabinet of Ministers No. 925 dated November 13, 2018.

Director	Rustam Ibragimovich Khalmuradov, D.Sc. in Engineering
Deputy Director for Research and Innovations	Khakim Abdilkhalkovich Khusvaktov, Ph.D., Mathematics and Physics
Number of students	197
No. of teaching professors	16
of them, academic degrees are held bys	5 (5 Ph.D.)
Faculties	-

Currently there are around 200 students at the Institute.

A scientific research is being conducted in the following fields:

- Mining (different areas);
- Chemical tech (by different types of production);
- Mechanics, equipment and automation;
- Automation and tech processes control (in different branches);
- Mining electromechanics;
- Power engineering (in different departments), etc.

Professors and students have published 68 academic papers in the period 2019 to 2020 of which:

- 1 article in scientific journals included in the Scopus and Web of Science databases;
- 11 articles in other foreign magazines;
- 9 articles in national scientific journals reviewed by the State Commission for Academic degrees and titles;
- 2 articles in other republican magazines;
- 10 theses in compendiums and international conference materials;
- 32 theses in compendiums and republican conference materials;
- 3 monographs, study guides, textbooks and tutorials, etc.

Moreover, 4 copyrights for the sofrware product were received as part of the research activities.

9. Nucus Branch of Samarkand Institute of Veterinary Medicine

The branch was founded by Resolution the Cabinet of Ministers of the RUz ПКМ No. 926 dd. November 13, 2018.

Director	Associate Prof. Adilbay Tlepovich Esimbetov, Ph.D. in Biology.
Deputy Director for Research and Innovations	Prof. Ruzimbay Urazbaevich Turganbaev, D.Sc. in Agriculture
Number of students	489
Numbwer of teaching professors	17
of them, academic degrees are held by	9 (1 D.Sc. + 8 Ph.D.)
Faculties	-

Currently there are around 500 students in 6 different fields of study at the university.

1 PhD has successfully been defended in 2020 by the academics of the university.

A scientific research is being conducted in the following fields:

- Animal breeding;
- Feeding;
- Veterinary.

One applied project on “Productive herds of dromendary camels in the Republic of Karakalpakstan and the development of product processing technologies for camel breeding” was delivered in 2020 as part of the State scientific programs.

One project application submitted in 2020 to participate in the international join project competition:

Professors and students have published 139 academic papers in the period 2019 to 2020 of which:

- 31 article in scientific journals included in the Scopus and Web of Science databases;
- 4 articles in other foreign magazines;
- 37 articles in national scientific journals reviewed by the State Commission for Academic degrees and titles;
- 3 articles in other republican magazines;
- 26 theses in compendiums and international conference materials;
- 29 theses in compendiums and republican conference materials;
- 9 monographs, study guides, textbooks and tutorials, etc.

Two proposals for production received in 2020.

Twelve copyrights for software product received as part of the research activities.

The branch plans to organize a vet clinic in 2021, which will:

- Provide diagnosis and treatment of farm animals;
- Provision of medicals.

10. Karakalpak branch of the Academy of Sciences of the Republic of Uzbekistab

The first scientific institution in Karakalpakstan, a comprehensive research Institute, was established in 1931. In 1939 it was transformed into the Institute of History, Language, and Literature under the Council of People's Commissars of the KK ASSR, and in 1947 became a part of the Uzbek SSR Academy of Sciences as the Karakalpak Research Institute of Economics and Culture. Since 1957 it became a Complex Research Institute. Under the Decree No. 534 of the Council of Ministers of the Uzbek SSR, dated July 25, 1959, the Karakalpak branch of the Academy of Sciences of the Uzbek SSR was organized under this Institute. In 1991 it was repurposed into the Karakalpak branch of the Academy of Sciences of the Republic of Uzbekistan.

Chairman	Prof. Nagmet Kallievich Aimbetov, D.Sc. in Economics
Chief Academic Secretary	Prof. Sharibay Nurizbaevich Turemuratov, D.Sc. in Chemistry
Composition of Presidium	15 (9 D.Sc. + 6 PhD)

Currently, the Karakalpak branch is the largest regional branch of the Academy of Sciences in the RUz. The main scientific directions of the department are the study of regional problems of biodiversity conservation, rational nature management, socio-economic problems, the study of history, archeology and ethnography of the peoples of the Southern Aral Sea region, Karakalpak folklore studies, lexicography and literary and artistic language of classics.

The branch hosts a fundamental scientific library. The total No. of books stored in the library - 119 694, of which 68,955 are books and 50,739 are periodicals. The department of rare manuscripts and old printed books is the pride of the library.

The branch also hosts 4 unique scientific objects:

1. The manuscript collection of the Fundamental Library of the Karakalpak Branch of the Academy of Sciences of the RUz. The collection is made up of over 700 manuscript copies and lithographic issues (560 titles in total). They include: classical works of Oriental literature, treatises on grammar, philosophy, medicine, manuscripts on history, literature and literary criticism, folklore, ethics, logic and fiqh (law). The linguistic breakdown of these is as follows: 47% in Arabic, 13% in Persian, and 40% in Old Turkic.

2. A compendium of archaeological, anthropological and numismatic collections together with the Aral Sea archeology. The object contains collections of anthropological, archeological materials and numismatic materials. The anthropologic collection has up to 4,000 items (craniological and osteological materials). Archaeological collection consists of collections of excavated most ancient, ancient and medieval monuments of the Aral Sea region. The total number of stored items reaches 50 000. The numismatic collection consists of ancient and medieval Khorezm coins, exceeding more than 1000 items. They cover the period from the first issues (II century B.C.) of the ancient Khorezm coins and up to the XIV century A.D.
3. Experimental desert station on the Ustyurt plateau and Muynak biological station on the dried Aral Sea bottom. The Ustyurt desert and Muinak biological stations are of great scientific importance – they serve to study the Ustyurt desert ecosystems, as well as the dried seabed of the Aral Sea and its regions. The regularities of floristic and faunistic composition of ecosystems in the region are being studies. Other noteworthy activities are: clarification of their rare endangered species for conservation of the gene pool and development of ways of rational use of natural bioresources in the national economy; Creation of long-term agrocenoses on the scientific basis instead of low-yielding natural pastures through acclimatization and introduction of new, high-yielding, drought-salt-resistant plants; study of soil cover formation, erosion, dynamics of salt-dust migration, their impact on soil and land formation; development of methods of consolidation of the dried Aral Sea bed soil by biological, mechanical and chemical methods.
4. Botanical Garden of the Karakalpak Branch of the Uzbek Academy of Sciences. The Botanical Garden is found at the “Shadly Auyl” district of Nukus city and takes up 40 hectares. Its primary goal is to enrich the flora of Karakalpakstan with new species of wood, fruit and herbaceous plants from different geographic zones and regions of the world, the selection of the most valuable and promising species from among the introduced to be used in the national economy, research and preservation of the gene pool of rare and endangered plant species and conservation of the national habitat in the region, as well as to conduct teaching and research and education work in botany and nature conservation. There exists a seed fund of local and foreign plants.

11. Karakalpak Research Institute of Natural Sciences

Karakalpak research Institute of natural sciences (KRINS) was founded in 2012 by merging Complete Institute of natural sciences (dates back to 1931), Bioecology Institute created in 1994 and the Institute of social-economic issues of the Aral region founded in 1976 as per the decree of the cabinet of ministers of RUz No. 33 dd. February 7, 2012 “On measures to further optimize the structure and improve the activities of scientific institutions of the Academy of Sciences of the Republic of Uzbekistan”.

Director	Prof. Nagmet Kallievich Aimbetov, D.Sc. in economics
Deputy Deputy Director for Research and Innovations	Prof. Svetlana Mirzamuratovna Mambetullaeva, D.Sc. in biological sciences
No. of PhD candidates	18
No. of employees	46
of them, academic degrees are held bys	27 (7 D.Sc. + 20 Ph.D.)

Three PhDs and four D.Scs have successfully been defended in 2020 by the academics of the university.

Currently scientific research is being conducted in the following fields:

- Modern problems of solid state physics and material science;
- Research of medical and aquatic plants of the Republic of Karakalpakstan, application of plants as sand-strengthening agents;
- Resource potential study of the various fish reservoirs in the Southern Aral region, fauna complex of the dried Aral Sea bottom;
- Study of adaptation mechanisms and population dynamics of mammals in the Southern Aral Sea region;
- Hydro impact study on the ornithofauna in the Aral Sea region;
- Colloid-chemical regularities research of the structural formation in disperse systems of different background,
- Development of resource-saving technologies for production of binders, construction materials and mineral fertilizers on the basis of local mineral raw materials and industrial wastes, development of methods for isolation and determination of the structure of biologically active substances - carbohydrates, lignins, phenolic compounds;
- Geological structure and oil and gas bearing capacity of Karakalpakstan territory, features of physical and mechanical properties of saline soils, development of engineering and geological scientific basis for economic, reliable design and safe operation of engineering structures;
- Salt removal studies of the Aral Sea region. Its impact om soil and climatic conditions and on the health of population;
- Regional economy studies, Republic of Karakalpakstan;
- Modeling of demographic processes;
- Local mineral resource studies in the national economy of the republic of Karakalpakstan;
- Transport infrastructure research;
- Modeling the water balance of Amu Darya delta lakes.

Currently 3 fundamental and 5 applied projects have been delivered as part of the scientific research.

Professors and students have published 173 academic papers in the period 2019 to 2020 of which:

- 6 articles in scientific journals included in the Scopus and Web of Science databases;
- 42 articles in other foreign magazines;

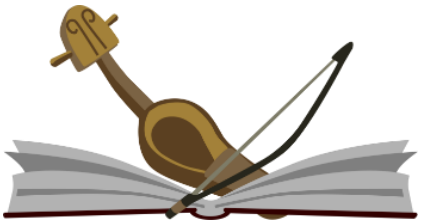
- 47 articles in national scientific journals reviewed by the State Commission for Academic degrees and titles;
- 45 theses in compendiums and international conference materials;
- 23 theses in compendiums and republican conference materials;
- 10 monographs, study guides, textbooks and tutorials, etc.

One copyright for software product received as part of the research activities.

According to the Decree of the Higher Attestation Commission under the Cabinet of Ministers of the Republic of Uzbekistan "On the formation of the Scientific Council for awarding academic degrees" № 334 of December 29, 2019, the Scientific Council PhD.02/30.12.2019 functions in Karakalpak Research Institute of Natural Sciences KCO of the Academy of Sciences of RUz. B79.01 in awarding the D.Sc. in Philosophy degree in the specialty 03.00.10 - ecology (biological sciences).

Annually the Institute holds international scientific and practical conferences for young scientists, national scientific-practical conferences in chemistry, soil science and agriculture.

12. Karakalpak scientific Institute of humanitarian sciences



Founded in 2012 after merging the Institute of history, archeology and ethnography and the Institute of language and literature named after N. Davkaraev of the Karakalpak branch of the Academy of Sciences of Uzbekistan. According to the Decree of the Cabinet of Ministers of the Republic of Uzbekistan ПКМ No. 33 dd. 07.02.2012 and the order of the Academy of sciences of the RUz No. 5-21 dd. 09.02.2012.

Director	Aytmuratov Ismailovich Alniyazov, D.Sc., Philology
Deputy Deputy Director for Research and Innovations	Makset Abdibaevich Karlybaev, Ph.D. in historical sciences
No. of doctorants	19
No. of employees	38
of them, academic degrees are held bys	19 (6 D.Sc. + 13 Ph.D.)

Six (PhD) and 2 (D.Sc) have successfully been defended in 2020 by the academics of the university.

Currently scientific research is being conducted in the following fields:

- Karakalpak linguistics;
- Karakalpak literature;
- Karakalpak folklore;
- History;
- Ethnography;
- Archeology.

Currently 1 fundamental and 1 applied projects have been delivered as part of the scientific research.

6 applications have been submitted to participate in the following scholarships:

1. Ethnolinguistic world in the Karakalpak folklore;
2. Karakalpak literary criticism from the viewpoint of the ideology of independence, (1 volume);
3. Traditional culture against the backdrop of globalization and environmental crisis in Karakalpakstan;
4. Environment and its impact on the ethnic and social history of the Southern Aral Sea nations;
5. Publication of the “History of Karakalpakstan” (1917-1991)” book;
6. Compilation of the Karakalpak dictionary of literary terms.

Professors and students have published 255 academic papers in the period 2019 to 2020 of which:

- 8 articles in scientific journals included in the Scopus and Web of Science databases;
- 35 articles in other foreign magazines;
- 65 articles in national scientific journals reviewed by the State Commission for Academic degrees and titles;
- 13 articles in other republican magazines;
- 36 theses in compendiums and international conference materials;
- 78 theses in compendiums and republican conference materials;
- 20 monographs, study guides, textbooks and tutorials, etc.

The Institute has two unique facilities where scientists, including young specialists of the republic, conduct their scientific research:

“Archaeological, anthropological and numismatic collections with a museum of the Aral Sea region archaeology”, on the basis of which fundamental and applied scientific archaeological research of the region is conducted. The object's funds represent a unique research base.

The unique facility with the Fundamental Library's manuscript collection, which presents manuscript material for the study and research of the history and culture of the peoples of the Southern Aral Sea people.

The Institute is the only scientific unit in Karakalpakstan, which studies the cultural and domestic features of the Karakalpak people in their historical development, as well as their ethnogenesis, settlement and mutual influences, on the study of Karakalpak national folklore, literature.

15. Karakalpak state scientific-research Institute of agriculture

Karakalpak state scientific-research Institute of agriculture was founded on May 28, 1958. It was reorganized as per the Decree of the President of the RUz dd. February 10, 2014 г. No. ПП-2125 “Improving the Agricultural scientific-development center of Uzbekistan”.

Director	B.Kh. Turdyshev, Ph.D. in Agricultural sciences.
Deputy Deputy Director for Research and Innovations	M.E. Ismaylov, Ph.D. in Agricultural sciences.

Number of doctorants	-
Number of employees	17
With degrees	17 (6 DSc. + 11 PhD.)

1 DSc has successfully been defended in 2020.

Currently scientific research is being conducted in the following fields:

- Selection and seed production of cotton;
- Selection and seed production of oil crops;
- Selection and seed production of bean and grain cultures;
- Selection and seed production of feed crops;
- Fertility and crop rotation;
- Mechanization of agriculture.

Currently, research activities are conducted in the direction of “Development of agriculture and methods of application of agro-technologies in agriculture and crop production”.

Two applied projects have been implemented as part of the State scientific and technical programs:

1. FZ (Ф3-2019081595) – “Development of technology and technical means for the combination of soil preparation and sowing, providing cultivation of crops in extreme water deficit conditions of Karakalpakstan” (2020-2022);
2. FZ (Ф3-201908162) – “Development of agricultural technology of spring wheat cultivation and organization of primary seed production in the Republic of Karakalpakstan. (2020-2022).

Seven applications have been submitted in 2020 to participate in the national and international scholarship programs in the following domains:

1. Development of technology and technical means for the combination of soil preparation and sowing, providing cultivation of crops in the extreme water shortage conditions of Karakalpakstan.
2. Development of agricultural technology of spring wheat cultivation and organization of primary seed production in the Republic of Karakalpakstan.
3. Organization of primary seed production of disappearing water-deficit resistant, salt tolerant and productive varieties of Sudan grass (sorghum sudanense (Piper) and sorghum (sorghum saccharatum L) in the conditions of Aral Sea region.
4. Organization of primary seed production of alfalfa variety “Karakalpak-15” in the Aral Sea region.
5. New promising early maturing cotton varieties of 110-115 days, high-yielding 40-45 cwt/ha, fiber yield above 37-38% and fiber quality of IV-V type were created on the basis of new varieties lines.
6. Creation of new promising varieties of sunflower, from simple and complex hybridization with a ripeness of 85-90 days, a high yield of 20-25 kg / ha, high fat content of 48-50% and yield of 60-65% of the kernel suitable for the soil and climatic conditions of Karakalpakstan.
7. Organization of primary seed production of promising winter wheat variety “Chimboy”.

Professors and students have published 60 academic papers in the period 2019 to 2020 of which:

- 1 article in foreign magazines that are part of Scopus, Web of Science databases;

- 7 articles in other foreign magazines;
- 12 articles in national scientific journals reviewed by the State Commission for Academic degrees and titles;
- 2 articles in other republican magazines;
- 10 theses in compendiums and international conference materials;
- 26 theses in compendiums and republican conference materials;
- 2 monographs

the Agency of the intellectual property of RUz submitted 2 patent requests for the type plants (NAP 2020 0051 “Chimboy”, NAP 2020 0052 “Aral”) in 2019-2020.

Analytical note on recent updates in STI policy in Uzbekistan for 2020

In order to create favorable conditions for the development of science, technology and innovation (STI) in the Republic of Uzbekistan, distribute responsibility, functions and rights of key stakeholders in the system, strategic documents have been adopted in the sphere during the period of 2020:

1. Law of the Republic of Uzbekistan "On innovative development" (No 630, adopted on July 24, 2020)

The Law provides main terms used in innovative development, including innovation, innovation infrastructure, innovation project, government, state order on innovation creation, technology transfer and novel development.

The Law outlies government regulation of innovation related activities and lists priority directions of state policy in the sphere of innovation development, including ensuring legislative regulation of innovative development, setting priority directions of innovative development based on technological forecasts, creating necessary conditions and infrastructure for leading activities related to innovative development, government support and stimulating the subjects of innovative development, development and implementation of national, sectoral and territorial programmes of innovative development, attracting investment in innovative development, developing PPP for innovative development, training, re-training and skills enhancement of workers in the sphere of innovative development, strengthening international collaboration in the sphere of innovative development. The Law also outlines the authority of the Cabinet of Ministers and the main government regulator of innovation development – The Ministry of innovative development responsible for regulating and coordinating all state activities related to innovation. Moreover, the authority of other government bodies is also outlined, including their participation in implementing innovation policy as well as participation in developing, financing and implementing innovation projects.

Notably, the Law outlines the necessity of developing Strategies of innovative development for medium and long-term periods of time based on main targets and goals of the state policy. Additionally, the Law describes the procedure of forming state orders on creating and developing innovations based on the proposals from the Academy of science, as well as the overall procedure for conducting innovation projects expertise and criteria for selection the most successful and promising projects.

Furthermore, the Law also lists the main subjects (stakeholders) taking part in innovation-related activities, including individuals, government bodies and state companies taking part in implementing state innovation policy, scientific research institutions and universities developing new products or technologies, NGO's, owners of intellectual property rights used in innovative development of the country, investors and private companies investing in innovation related activities, as well as outlines their rights and obligations.

For the first time in Uzbek legislation, such Law lists types of innovations in accordance with OECD definition of innovation, particularly product innovation, process innovation, marketing innovation and organizational innovation. The risks associated with implementing innovation related activities are also listed and corresponding measures for mitigation are listed, including spreading the risk of innovation related activities among the subjects of innovation activity and the state, spreading resources among innovation projects and applying insurance mechanisms for risk coverage.

In order to bring clarity in the process of technology transfer, the Law lists priority areas of technology transfer such as enhancing quality of production and increasing competitiveness, production of new

products, implementing energy and resource-saving technologies. The main directions and mechanisms of technology transfer are also included. The main directions of commercializing new developments are also indicated.

In order to support creation of necessary conditions for conducting innovation related activities, a separate section is included on innovation infrastructure specifying key entities (innovation technology park, center of technology transfer, innovation cluster, venture organization, innovation center) and providing guidelines for their activities.

Additionally, the Law outlines sources of financing of innovation related activities, including state funds, venture funds, own funds of main entities of innovation activities, international grants, credits of international and local commercial banks, investors' funds.

2. Decree of the President of the Republic of Uzbekistan "On appoval of Science development concept until 2030" (No 6097, adopted on October 29, 2020)

The Concept is based on the relevant problems associated with scientific development in Uzbekistan. Such problems include:

- low interest of enterprises in the real sector of the economy in science. The low interest of economic sectors in the implementation in practice of technological developments and scientific research of domestic scientists is an obstacle to the technological development of the country's economy and places a heavy burden on the state budget. In addition, a significant part of scientific projects is formed as an initiative of scientific organizations and not as priority areas for the country, implying that such organizations are implementing their functional tasks and aren't results oriented;
- lack of economic cooperation between entities of innovation infrastructure (innovation funds, technology introduction centers, engineering laboratories, technoparks) suggests to improve knowledge transfer and technologies on domestic and world markets;
- lack of small innovation enterprises and knowledge-intensive products;
- the system of science organization, spending prediction and conducting economic analysis in scientific organizations isn't developed enough;
- low level of private sector involvement in the development of scientific potential;
- increasing average age of researchers;
- low number of researchers in relation to the population (about 950 researchers per million population);
- low level of local and international patent registration received as a result of scientific research and innovation projects financed by the state budget (currently there are 700 patents, 1% out of 700 is international);
- low level of development of economic and legal mechanisms for commercializing patents;
- low level of science and research financing (currently 0,2% of GDP);
- lack of ties between scientific and educational institutions; lack of science, education and industry integration;
- low level of research commercialization;
- non-harmonization of the attestation process in postgraduate education, quota system and the awarding of scientific degree with world experience;

- concentration of scientific organizations in the capital with lack of modern scientific laboratories in the regions;
- low level of technological modernization of scientific base;
- low level of competition between scientific organizations;
- lack of independent scientific experts causing a conflict of interest;
- lack of scientific results propaganda;
- lack of publications in international scientific journals with high impact factor.

Considering the abovementioned problem areas, the Concept outlines main spheres of science development, including:

I. Improvement of science management system

The following work is being carried out:

- application of the program target approach in science management, introduction and use of new management tools taking into account the best international experience of effective project management for providing an opportunity for effective distribution of budget funds within the organization, monitoring project implementation process and making adjustments to their implementation taking into account changes in the internal and external environment.
- development of a national program with inclusion of a strategic optimal base of target indicators, preparation and implementation of work on expert analysis and forecasting in the field of scientific activity to determine the current level of scientific development and future prospects;
- conducting an independent scientific audit of the scientific potential, state scientific and technical expertise and priority areas for the development of science in the country by international audit organizations in order to assess the state and activities of scientific organizations, coordinate state policy in the field of science development, determine the tasks and directions of strategic development of the sphere of science, identify the positive and negative aspects of the development of the field of scientific research on a systematic basis (once every three years);
- creating a system of annual monitoring and a national rating of scientific organizations;
- creating a foresight group and conducting foresight research to identify prospective scientific and technologic areas of innovative development in all sectors, conduct economic assessment of the research and science results;
- introducing new practice of appointing young specialists with the skills of science management and economic expertise to management positions in scientific organizations;
- creating a scientific community in every sphere of science in order to enhance partnerships between the government and scientific organizations.

II. Improvement of science financing system and diversification of finance resources

Currently, the funds' assignation on R&D is the following:

State funds and type of research: on developing and supporting science in fundamental research (15%), applied research (20%), developments (65%);

Sources of funds: state budget (45-50%), private sector (45-50%), foreign investment (5%).

Funding is required for priority research and programs of national importance (mineral resources, mining and fuel and energy industries, water management systems, ensuring seismic and environmental safety, preventing and eliminating the consequences of natural and man-made emergencies, and others).

III. Preparing highly qualified scientific and engineering human capital

The following work is being carried out:

- formation of a new research infrastructure in leading scientific organizations and universities, staffed with qualified personnel capable of conducting high level scientific research;
- targeted preparation of DS's and PhD's in priority science areas;
- inclusion in the procedure for conferring the academic titles "associate professor" and "professor" of the requirement for the experience acquired after doctoral studies;
- introducing a new HR policy with high attention paid to strategic HR management
- organization of advanced training courses for scientists studying English with the implementation of programs for teachers and students between leading domestic universities and foreign universities for retraining and continuous professional development of specialists
- organizing short-term scientific internships, training, advanced training in leading foreign research centers, participation in international scientific and technical conferences and scientific projects, publication of academic papers of young talented scientists;
- organizing professional trainings for researchers and scientists;
- improving the system of personnel training with an academic degree in line with world standards;
- providing Ministry of innovative development with the authority to allocate quotas for postgraduate education;
- creating favorable conditions for bachelor's and master's students for conducting scientific activity;
- Improving current mechanisms of work and coordination of PhD students.

IV. Development of modern scientific infrastructure

- equipping laboratories of scientific organizations and higher educational institutions with modern equipment;
- creating a network of national scientific laboratories (scientific organizations and higher educational institutions);
- ensuring effective utilization of scientific organizations potential to allow a wide access for domestic and foreign scientists to equipment, experimental production bases and other scientific resources of centers that meet global GLP and GMP standards;
- focus on development and support within the framework of investment programs of non-state design and construction organizations;
- creating scientific and innovative clusters, innovation centers, design workshops, business accelerators and start-up accelerators as part of scientific organizations and universities, in regional centers - innovation centers, youth technology parks, technology transfer centers, small research and production clusters and innovation testing grounds;
- creating separate companies engaged in the commercialization of scientific developments and marketing of products to promote developments created within the framework of scientific programs;

- creation of funds with the participation of the private sector and economic entities, including government bodies, as well as conditions for the commercialization of new developments;
- establishing a structure responsible for scientific projects assessment to minimize the risk of "conflict of interest" in the process of conducting scientific expertise, ensuring that the expertise is carried out through an interactive platform with the involvement of foreign experts in discussions.

V. Development of modern information environment for science development

- designing a national scientific portal to ensure a single academic space including information about the scientific potential of the country, a system for submitting and registering applications for funding research projects;
- introduction of ratings of scientists, organizations, sources of scientific and technical information. the introduction of objective quantitative indicators contributes to the selection of projects for financing, increasing the efficiency of research activities;
- forecasting scientific and technological development for identifying necessary scientific research required by manufacturers of science-intensive products at the domestic and international level;
- assessment of the scientific and technical potential of the country: analysis of the current scientific state and trends of further development is carried out by studying the qualitative and quantitative development of science in the country in recent years, identifying and analyzing strengths and weaknesses of the domestic scientific and technological potential, analyzing the activities of scientific organizations and higher educational institutions, as well as the effectiveness of the scientific infrastructure development, improving the assessment system of the effectiveness and efficiency of research programs.

The following results are expected after implementing the Concept:

- coordination, effective management and redirection of scientific research programs to priority scientific areas;
- achieving balanced funding of science by the state and the private sector through basic, targeted program and grant funding;
- implementation of GSP and GLP standards, organizing the activities of national scientific laboratories in accordance with GLP and GMP standards that meet international criteria;
- elimination of plagiarism and attribution of scientific ideas to protect the intellectual property rights of scientists;
- introduction of a new system of material incentives for workers in the field of science;
- increasing the activity of patenting the R&D results within the republic and abroad;
- development and implementation of scientific programs in priority scientific areas and achievement of competitive results;
- expanding the participation of business entities in research activities, including national companies, by introducing mechanisms for the implementation of joint scientific and technical programs, financing research projects on the basis of equal partnership and creating incentive mechanisms for the private sector;
- creation of a documenting system of the scientific results that meets business requirements;
- commercialization of scientific research results on the market;

- alignment of research reports with international management and scientific practice;
- creation of effective and favorable conditions for users of domestic and international scientific and technical information;
- creation of scientific centers with the participation of foreign investors;
- expanding the mutual exchange of scientific achievements via creation of a modern and developed scientific and innovative infrastructure.

3. Decree of the Government of the Republic of Uzbekistan "On organizational matters of the activity of National venture fund "UzVC" (No 684, adopted on November 3, 2020)

The main goal of the National venture fund is to create an infrastructure that would support innovative ideas and startup ecosystems.

The fund is created in the form of an LLC with an initial authorized capital of 15 billion soum. It will be formed from the state funds allocated to the Ministry of innovative development in 2020, which then will be transferred to the Agency of state assets management.

The UzVC venture fund will finance venture projects of legal entities and individuals, including in partnership with foreign entities.

To enable effective management, it is planned to attract qualified and internationally experienced foreign citizens.

One of the conditions for venture financing is to attract an equal amount of allocated funds from the private sector.

The activities of investment and management companies are not subject to licensing. In addition, the management company is obliged to organize an internal audit service.

The need for fund creation was discussed back in 2018, when the President of the Republic of Uzbekistan signed a decree on additional measures to improve the mechanisms for financing projects in the field of entrepreneurship and innovation.

Moreover, in accordance with the Presidential Decree "On Approval of Science development concept until 2030", it is planned to launch two venture capital funds jointly with leading foreign investment companies in Uzbekistan in 2021 to finance innovative developments and start-up projects. It is noted that in 2025 it is planned to create 10 more similar organizations.

4. Decree of the Government of the Republic of Uzbekistan "On measures to ensure transparency and increase the efficiency of the training process of scientific personnel" (No 696, adopted on November 6, 2020)

The Decree states that a single electronic system for coordination of postgraduate education will be formed on the basis of the official website of the Ministry of innovative development.

It is planned to unite all existing postgraduate education institutions and include trainee-researchers, researchers, supervisors and consultants in the system. This way, the work progress on individual plans of researchers will be coordinated. Additionally, the effectiveness of postgraduate education institutions will be monitored and assessed.

The Decree also states that the applications of research internships and admission quotas for doctoral studies, as well as the registration of applicants for postgraduate education will be formed and processed online.

Within the framework of the single electronic system, responsible government bodies implement the following:

1. Ministry of innovative development of the Republic of Uzbekistan:
- Ensuring the effective use of the system by ministries, agencies, scientific and educational institutions, as well as provide methodological guidance on its use;
- Preparation of proposals for a wider introduction of innovative methods of work in the postgraduate education system with the use of modern information and communication technologies;
- Improvement and modernization of the system taking into account the proposals of ministries, agencies, local executive authorities and other government organizations involved in the process of using the system;
- Ensuring quality and uninterrupted operation of the system;
- Ensuring continuous technical support of the system.
2. Cybersecurity center - ensuring full security of the system
3. Ministries and agencies - implementation of the information transfer in the prescribed manner and time;
4. Scientific and educational institutions providing postgraduate education - ensuring the accuracy and completeness of information on applicants, trainee researchers, researchers, supervisors and research consultants;
5. Use of the system in the process of forming proposals on the admission quota for postgraduate education, receiving documents from applicants and organizing admissions, electronic storage of information on researchers, supervisors and scientific consultants.

The Decree also outlines a detailed scheme of formation of the applications for admission quota for internship-research, basic doctoral studies, doctoral studies financed by the state budget of the Republic of Uzbekistan. Additionally, a detailed scheme of organization of student research, basic doctoral, doctoral student application registration and admission is also provided.

5. Priority scientific areas identified in Uzbekistan

The following scientific areas are identified as priority for improvement scientific research, commercialization of research results and improvement of the overall organization and coordination system:

- Geology;
- Mathematics;
- Biology;
- Chemistry.

Relevant legislation acts were developed and adopted to outline concrete measures for improving the system of science management and improving the level of research commercialization in 4 abovementioned areas.

For improvement of the sphere of geology a Decree of the Republic of Uzbekistan "On measures of organization of University of geological sciences in the system of State committee for geology and mineral resources" (No 4740 adopted on June 8,2020), in the sphere of mathematics "On measures for improving the quality of education and scientific research in the sphere of mathematics" (No 4708 adopted on May 7,2020), in the sphere of biology and chemistry "On measures for improving continuous education and effectiveness in the sphere of chemistry and biology" (No 4805 adopted on August 12,2020).

6. Reflection of Uzbekistan's progress in STI development – The Global Innovation Index-2020

The Ministry of Innovative Development has studied matters of innovation system development in the country and strengthening the position of Uzbekistan in international ratings in the field of innovation.

On September 2, 2020, an annual report of Global Innovation Index (hereinafter referred to as the index), prepared by the International Institute of Business Management (France), Cornell University (USA) and the World Intellectual Property Organization, was published.

The index consists of 80 indicators grouped in 7 main pillars (Institutes, Infrastructure, Human capital and research, Market sophistication, Business sophistication, Knowledge and technology outputs, Creative outputs).

As a result of the measures taken within the framework of the implementation of the Strategy for Innovative Development of the Republic of Uzbekistan for 2019-2021, Uzbekistan has entered the index in 2020 after a 5-year absence.

In comparison with 2015, Uzbekistan has improved its rating by 29 positions in 2020, scoring 24,54 out of 100 and ranking 93rd among 131 countries and 4th among Central and Southern Asian countries. Uzbekistan scored 81 for innovation inputs and 18 for innovation outputs.

This year, the country has improved its ranking in 4 pillars, while in 7 pillars the position has lowered. In particular, in comparison with 2015, "Institutions" pillar positions were increased by 6.1 points, "Human capital and research" by 0.5 points, "Infrastructure" by 9.5 points and "Market sophistication" by 10.5 points.

Along with this, indicators in "Business sophistication" pillar decreased by 4.8 points, "Knowledge and technology outputs" by 13.1 points, "Creative outputs" by 1 point.

The international developers of the index note the following factors that influenced the increase in the position of Uzbekistan this year:

- Simplification and improvement of the procedures for starting a business;
- Implementation of financing of the education system at an appropriate level;
- A positive ratio of the number of teachers and students;
- Growth of research in science and engineering;
- Positive dynamics of the growth of the influence of scientific achievements on the economy;
- Increase in labor productivity;
- Increased export of cultural and creative services.

A Decree of the President of the Republic of Uzbekistan "About improving positions of the Republic of Uzbekistan in international rankings and indices, as well as implementing a new mechanism of systemic work

with indices in government bodies" was adopted on June 2, 2020 in order to establish a new mechanism of working with international rankings in ministries, as well as allocate responsibility for carrying out works on specific indices in government bodies. The Council for coordinating works with international rankings is headed by the head of Senate of the Republic of Uzbekistan exposing a high level of interest in the sphere from the government's side.

Currently, The Ministry, with the assistance of the World Intellectual Property Organization, is studying the experience of developing countries that showcased a rapid growth in the GII rating. In particular, at the seminar held within the framework of InnoWeek-2020 in October 2020, contacts were established with competent organizations and government bodies of India and Kazakhstan to study experience in the field of innovative development policy and continue establishing a strong STI system. Moreover, it is planned to establish ties with Vietnam and Philippines in order to learn the experience of these countries in the sphere of innovation policy planning and execution.

A thorough analysis of the current positions of Uzbekistan revealed the strengths and weaknesses of the national innovation system (which is built by many ministries and government bodies). In particular, Uzbekistan has significant advantages in 12 indicators, whereas 11 indicators and 1 subpillar (Knowledge Absorption) prevent the country from increasing positions in the ranking.

In 13 weak indicators, lags are mainly observed in sectors of ICT, science and education, capital market. On 15 indicators categorized as "missing data", lags are observed mainly in the financial and economic sector, ICT, education and labor market. International ratings provide an independent and objective assessment of the level of development of a particular sphere in Uzbekistan. Using the GII as an example, we identify areas that require special attention from the relevant ministries and departments to strengthen and develop the sphere to eventually reflect the current governmental reforms in international rankings.

Currently, the Ministry is working on priority indicators categorized as "missing data" and "weaknesses" together with the line ministries. The Ministry is working with the guidance of World Intellectual Property Organization, which helps establish ties with relevant international organizations. This way, the Ministry has established a mechanism for conducting works on GII "*Mininnovation + line ministry + international organization"* in order to work out specific indicators, receive assistance on methodology and discuss the format and deadlines for data provision. Currently, the Ministry is working with the Statistical office of UNESCO, International labour organization, WIPO and some other private analytical companies.

A detailed Roadmap outlining a plan of action for 2021 was developed in cooperation with the line ministries in order to increase positions in 13 low indicators. Key performance indicators for 2021, 2022 and 2030 were developed with line ministries under the guidance of relevant international organizations.

Instructions of the President on the development of science and innovation in Uzbekistan

As it was previously stated, the government of the country during the last years gives a great attention to the development of science and innovation.

The year 2020 was declared as the Year of development of science, education and digital economy. In this regard, 4 priority spheres for the development of science (mathematics, chemistry, biology, and geology) were determined[1].

> «We have to determine particular priorities in the field of science. No single state is able to develop all branches of science at the same time. Therefore, each year we will be focusing on the development of a few important areas. This year, measures will be taken to widely develop basic and applied research in areas such as mathematics, chemistry and biology, geology, and all necessary conditions will be created for scientists. It is necessary to create an electronic platform dedicated to scientific achievements, a database of domestic and foreign scientific works».
>
> President of the Republic of Uzbekistan Shavkat Mirziyoyev

Under the chairmanship of the President of the Republic of Uzbekistan Shavkat Mirziyoyev, on 3 December, a video conference was held on the priority tasks facing higher educational institutions, scientific organizations, industries and regions in the development of science and innovation. Existing critical issues were placed at the top of the agenda [2].

> «It is necessary to understand one thing: without science, without innovation, we will never achieve our goals. We need to work not for accountability, but for results».
>
> President of the Republic of Uzbekistan Shavkat Mirziyoyev

In particular, the problems of integration of science and production, development of budgetary funds aimed at innovative solutions, low publication activity of Uzbek scientists-researchers, and the level of the academic research were raised.

The Head of State gave precise instructions on the implementation of certain large projects in a number of regions. It was instructed to establish joint ventures in Namangan, Samarkand, Kashkadarya and Tashkent regions to service water-saving systems. The shortcomings in the implementation of water resources management project in Karakalpakstan were pointed out. The necessity of redesigning irrigation facilities, proper planning of water resources on the basis of the Research Center for Water Problems, organized in Khorezm region, was emphasized. Separately, the necessity to study the potential of technogenic wastes of Navoi and Almalyk mining and metallurgical plants was discussed.

[1] https://president.uz/ru/lists/view/3324
[2] https://president.uz/ru/lists/view/3985

Also, the areas of the technological development in some industrial sectors were indicated. The special demand for developments aimed at increasing productivity in agriculture, the effective specialization of territories, and the creation of products with high added value was emphasized. The Ministry of Agriculture and the Ministry of Innovative Development have been instructed to establish the production of new generation hybrid seeds and organize seed laboratories. A task was set to create a center for deep processing of oil and natural gas and the production of high added value products based on foreign experience.

The President drew special attention to the problems in the field of energy, noting the lack of tangible results in solving the problems in this area by specialized universities and scientific organizations. In view of this, the task was set to optimize, with the involvement of scientific organizations, the consumption of electricity at such large enterprises as Issiklik Electr Stantsalari, Navoiazot, Ferganaazot, Kyzylkumcement, Bekabadcement, Kuvasaycement. In addition, the need was noted to develop, together with scientific organizations, projects for the production of electricity from associated gas at the Mubarek, Shurtan and Gazli fields.

The achievements of the Institute of the Chemistry of Plant Substances in exporting substances to neighboring and distant foreign countries were observed in healthcare and pharmaceutical industry. It was instructed to create a special laboratory at the Institute to study the composition and standardization of medicinal plants, a preclinical research center and to allocate grants to scientists.

Instructions were given to establish organ transplantation operations at the Republican Specialized Scientific and Practical Medical Center of Surgery, and innovative heart surgeries at the Republican Center of Cardiology.

In general, for the integration of science and industry, the objection is to widely use the potential of technoparks.

Relevant instructions have been given to higher education institutions, research Institutes and the Ministry of Innovative Development.

The President placed great emphasis on the development of science and innovation.[3] in his message to the Oliy Majlis (Parliament of the Republic of Uzbekistan) on December 29

> “This year, for the first time, measures were taken for the integrated development of mathematics, chemistry, biology and geology as priority areas of education and science. In particular, 98 specialized schools and the University of Geological Sciences have been created. The curricula have been radically revised, the salaries of teachers have been increased.
>
> Now we need to set priorities in this area for the next year.
>
> As history shows, physics has served as the fundamental basis for almost all discoveries and technologies in the world.

[3] https://president.uz/ru/lists/view/4057

Indeed, without a profound knowledge of the laws of physics it is impossible to achieve results in such topical areas and fields such as mechanical engineering, electrical engineering, IT, water- and energy-saving technologies.

I think it would be appropriate to quote the words of the great Alisher Navoi, who wrote in this context:

“Leaving in search of knowledge, I am hundredfold sure that

That I will be able to find them not by luck, but by work.“

Indeed, a person who seeks to acquire knowledge and master new professions must work hard, work on himself, including learning foreign languages, without which it is impossible to reach high levels in the modern world.

Following these requirements, I propose to define the study of physics and foreign languages as a priority for the next year.”

President of the Republic of Uzbekistan Shavkat Mirziyoyev

The Head of State in his speech ordered to strengthen partnership and expand cooperation with leading foreign universities, scientific and innovation centers related to personnel training, to increase budget funds for PhD students in universities and research organizations (the number of PhD students will reach 4.5 thousand in 2021, which is three times more than in 2017). Based on the best international experience, the scientific councils of the leading universities of the republic will be delegated authority to award academic ranks of associate professor and professor, the scientific degrees of Doctor of Philosophy and Doctor of Science.

Activities of the Ministry of Innovative Development in the regions of Uzbekistan

In the course of the implementation of the tasks set by the President in the field of the development of science and innovation in the country, since it was established, the Ministry of Innovative Development has obtained results in all areas of its activities.

First of all, it should be noted that through the efforts of the Ministry, a strategic document aimed at combining the efforts of state bodies and organizations in the field of innovative development — **Decree No. UP-5544 of the President of the Republic of Uzbekistan** ***On Approval of the Strategy of Innovative Development of the Republic of Uzbekistan for 2019 to 2021*** dated September 21, 2018 — was adopted. The main objective of the Strategy is to strengthen the quality of human capital and to make the Republic of Uzbekistan one of the 50 leading countries of the world according to the Global Innovation Index (*GII*) by 2030.

To achieve the objective, in the past year, the Ministry took comprehensive efforts so that for the first time after a long break **our country** was re-included **in the Global Innovation Index rating. Uzbekistan was ranked 93rd out of 131** *(the last time in 2015, Uzbekistan was ranked 122nd out of 140).* This achievement became possible due to the special attention the President has been paying to the issues of increasing the efficiency of research and innovation activities in the country, ongoing reforms and the implementation of the policy of transparency and openness in the field of innovations.

For reference: in the GII, a total of 80 indicators are used to evaluate a country's innovation potential and achievements. Uzbekistan has achieved positive results in such indicators as Institutions, Human Capital & Research, Infrastructure, Knowledge & Technology Outputs, and Creative Outputs.

A large-scale work has also been done **to improve the regulatory framework of research and innovative activities** in the country. Over the past period, the Ministry has developed and implemented more than 62 regulatory documents.

The adoption of two most important laws of the Republic of Uzbekistan — *On Science and Scientific Activity* and *On Innovation Activity*, which today serve as a solid basis for the development of research and innovation activities in the country, was a landmark event, taking into consideration that an important condition for the dynamic development of Uzbekistan is the accelerated implementation modern innovative technologies in the economy, social and other sectors through the widespread use of the achievements of science and technology. The main task in this case is to fully use the country's scientific resources and ensure its entry the world market of innovative technologies, including by transferring and commercializing research and technology.

Also, last year, **the Concept for the Development of Science of the Republic of Uzbekistan until 2030**, developed by the Ministry, was adopted, which defines the foundations for the development of this area in the medium and long term. Thus, the Concept defines a plan for the phased development of science in terms of such indicators as:

- increasing the amounts allocated to research (in relation to GDP);

- increasing the share of researchers from Uzbekistan in the total number of papers published in international scientific journals;
- increasing the involvement of young specialists in research and bringing the average age of scientists to 39 years;
- upgrading machinery and equipment in research institutions and universities implementing scientific research projects.

To achieve the above objectives, the Concept provides for a roadmap that includes activities in the following areas:

- improvement of the management system in the field of science;
- improvement of the system for funding research and scientific activities and diversification of funding sources;
- preparation of highly qualified scientific and engineering personnel and their orientation towards scientific activity;
- creation of a modern infrastructure for the development of science;
- formation of a modern information environment that will promote the development of science.

Along with the Concept, the Law *On Startups* and the Strategy for the Development of Artificial Intelligence in the Republic of Uzbekistan for 2021-2022, being the basis for the formation of a startup ecosystem, which is a relevant and promising area for our country, were developed.

Currently, a special working group of experts is working on the development of the Strategy for Innovative Development of Uzbekistan until 2030.

The Government spending on science and innovation has increased significantly. In recent years, 950.2 billion UZS have been allocated from the state budget *(198 billion UZS in 2018, 324 billion UZS in 2019, 428.2 billion UZS in 2020)* for the implementation of programs and projects on research and innovative activities.

For a qualitative selection of scientific and innovative projects on a competitive basis, **for the first time in the country, new mechanisms for technical and scientific appraisal have been introduced.** Under the Ministry, Scientific and Technical Research Councils have been created, uniting more than 400 academicians, professors and doctors of sciences in 18 priority areas, the composition of which is periodically updated.

In accordance with the instructions of the President to enhance the role of women and youth in society and ensure their employment, in 2020, within the framework of grant programs announced by the Ministry, 16 projects of women scientists were funded in the amount of 8.5 billion UZS. In order to support youth start-up projects in 2018-2020, 7 competitions were organized, 81 innovative and start-up projects for the amount of 32 billion UZS were implemented.

Targeted projects and those with the participation of foreign partners are being implemented. In particular, 44 joint research projects have been implemented for a total of 17.4 billion UZS. The partner countries for the implementation of joint research projects include Russia, Belarus, Germany, China, Turkey, India, and others.

Also, it is planned to implement joint projects with the Eurasian Association for Promotion of Scientific Research (EAPI).

Thirty-five innovative startups involving investors, commercial banks and research institutions through the commercialization of promising scientific research were launched.

In order to introduce venture financing and attract financial resources of business entities for innovative projects, Decree No. UP-5583 of the President of the Republic of Uzbekistan dated November 24, 2019 was adopted.

In addition, this year, the Ministry plans to implement three large investment projects, such as *Creation of the Uzbek-Chinese Medical Technology Park for the Synthesis of Medicines*, *Modernization of the National Innovation System of Uzbekistan*, and *Growing Industrial Cannabis*, for a total of 18.5 million US dollars.

In accordance with Decree No. PP-3855 of the President of the Republic of Uzbekistan *On Additional Measures to Increase the Efficiency of Commercialization of the Results of Research and Scientific & Technological Activities* dated July 14, 2018, a new system of commercialization of scientific research results was created, aimed at ensuring the accelerated introduction of domestic scientific, applied and innovative projects and developments, increasing the contribution of science to enhancing the competitiveness of the country's economy, as well as creating effective mechanisms for promoting the country's promising achievements of research and scientific & technological activities.

In 2020, the Ministry reached agreements with 17 industry organizations to allocate 147 billion UZS, 32.2 billion UZS of which were directed to specialized scientific institutions.

On an ongoing basis, the Ministry is working to analyze the effectiveness of all projects that were financed from the state budget. Since 2017, their number has amounted to about 1500. More than 4500 reports have been submitted on the projects. Each submitted report undergoes a specialized check. At the same time, specialists use international methods and the experience of foreign countries. To attract investors for the commercialization of the revealed results, the "Customer-Research-Investor" portal was launched, in which about 530 developments were registered.

In the period 2018 to 2020, 51 scientific research results were commercialized, science-intensive products amounting 80.5 billion UZS were produced and sold for 66.6 billion soums. In particular, in 2020, 42 scientific research results were commercialized, science-intensive products amounting 41.7 billion UZS were produced and sold for 33.2 billion UZS. Ninety scientific research results are at the stage of commercialization.

Also, this year, work will be carried out with higher educational institutions and scientific organizations in the regions of Uzbekistan in accordance with plans for organizing the preparation of scientific research results ready for implementation for the amount of more than 240 billion UZS.

Conditions are being created for the formation of a large-scale innovation infrastructure.

So far, 9 innovation infrastructure facilities have started their activity in Uzbekistan, including the Yashnabad Technopark, the Syrdarya Business Accelerator, and others. Another 10 facilities are expected to be launched in 2021.

In the period 2018 to 2020, the number of residents of the Yashnabad Innovation Technopark reached 35, 337 new jobs were created, products amounting 147.6 billion UZS were produced, while the volume of exported products in 2020 amounted to 1.1 million US dollars. On the whole, the Technopark residents invested about 4.6 million US dollars.

The Center of Excellence has created a startup accelerator and startup incubator for high-tech small companies, providing the existing infrastructure, premises, laboratories and equipment. Currently, 11 companies have the status of residents of the innovation incubator.

The Ministry also provided more than 170 types of laboratory equipment and devices for a total of 68.8 billion UZS to higher educational institutions and research institutes.

At the initiative of the Ministry, in order to carry out a complete diagnosis of the current state of the country's scientific potential and develop specific recommendations to improve the efficiency of the use of resources for the material and technical equipment of scientific institutions, corresponding to the world achievements of science and technology, as well as to improve the state system of science management and determine the strategic directions for the development of the science and research sector, the Belarusian Institute for System Analysis and Information Support of the Scientific and Technical Sphere is conducting an **independent audit of the scientific potential and appraisal of the infrastructure support of scientific research organizations.**

The Ministry has been actively involving the young people of the country in the field of science and innovation. Under the Ministry, the Youth Academy and the Talented Youth Support Fund were established.

Now, the number of members of the Youth Academy has reached 1,800 people. In the regions of the country, 15 leaders were elected, more than 40 events were held, 3.8 billion UZS were transferred to the Fund. Eighty-three projects are underway.

The Ministry hosts robotics competitions on a regular basis. In 2019, the country's youth team took part in the International Robotics Olympiad in Thailand and won a total of 7 medals (1 gold, 2 silver and 4 bronze medals).

In the period 2018 to 2020, short-term research internships in leading foreign scientific institutions were organized for 232 young scientists. Another 118 people are waiting for the opening of international transport flights.

Also, in order to develop the entrepreneurial potential of youth, the innovative marathon "Technoways" was organized last September. 50 participants from 11 teams took part in the marathon. As a result, 4 projects were financed by business angels.

In 2021, the Youth Academy plans to hold the HAKATON marathon aimed at developing new innovative developments. Such marathons are held abroadby almost all leaders of the IT industry. They are organized by corporations such as Facebook, Google, and TechCrunch.

In addition, at the initiative of the Ministry, the number of youth technoparks will be increased. Their construction will begin in Tashkent, Samarkand, Navoi Regions and in the Republic of Karakalpakstan in 2021.

Specific efforts are being made by the Ministry in order to develop innovative activities in the regions. In the structure of regional khokimiyats, departments for the development of research and innovative activities are being created. The Ministry, together with the khokimiyats, will hold joint competitions to select research and innovative projects to be funded. **The winning projects will be funded in equal shares from the country's budget - 50% and the local budget - 50%.**

The Youth Innovation Center was created in the city of Fergana, a Youth Technopark will be built on the territory of Karshi State University in order to promote the commercialization of the work of scientists and researchers of the region. The Innovative Training Data Center was created in Urgench, the Ministry of Innovative Development of the Republic of Uzbekistan created the Business Accelerator in Syrdarya Region.

With the support of the Ministry, the Scientific and Technical Research Council was created to select scientific and innovative projects aimed at solving regional problems of the Republic of Karakalpakstan. The Strategy of Innovative Development of the Republic of Karakalpakstan for 2021-2025 is being developed. The issue of organizing scientific internships for 100 young scientists and researchers of the Republic of Karakalpakstan abroad is being worked out. In collaboration with the International Center Biosaline Agriculture (ICBA), projects are being implemented to strengthen the role of women in society, to support them, including women's entrepreneurship development.

On the basis of Resolution PKM-№313 of the Cabinet of Ministers of the Republic of Uzbekistan dated May 22, 2020, the Ministry is implementing measures to create youth technology parks in the regions of the country. In order to form a team of talented youth to work in these technoparks, the Ministry has developed the mobile educational platform "TexnoBus".

Finally, the Ministry is taking vigorous efforts to improve the state system of scientific and technical information. This work is extremely important both for providing the necessary, reliable and complete data of the processes of making operational and strategic management decisions on the development of science and innovation and for high-quality information and analytical services for all subjects of the national innovation system.

For these purposes, at the end of 2019, the activities of the Center for Scientific and Technical Information were launched. During the first year of its existence, the Center achieved the following results:

A database of electronic versions of reporting documentation on scientific and innovative projects financed from the state budget for the period 2017 to 2019 was formed. (*more than 4,500 reports on over 1,500 projects*) . Based on the reports collected, a performance analysis was carried out, the results of scientific and technical activities that have the potential for commercialization were identified.

Also, the Center takes an active part in the work of the Ministry for monitoring ongoing scientific and innovative projects: it analyzes the compliance of the work performed with the schedule, publications presented in the reporting documentation for compliance with their project topics and availability in the Scopus database, etc.; and technical expertise of incoming applications for funding of scientific and innovative projects.

Work is being done to provide information and analytical services to the branches of science, including preparation of digests and bulletins on the latest innovative technologies and scientific

developments in the country and abroad, as well as the National Report on Science of the Republic of Uzbekistan for 2017-2020.

COVID-19 vaccine development digests are prepared and published on a daily basis.

Scientific organizations are being provided with access to leading databases of scientific and technical information, such as SpringerLink *(Springer Nature)*, Clinical Key *(Elsevier)*, Wiley *(John Wiley & Sons, Inc.)*, etc., training webinars are conducted, and technical support is provided.

Work has begun to strengthen the work of the Office of the National Coordinator in Uzbekistan in terms of providing assistance to the scientific and innovative community in participating in competitions and events of the 9th Framework Program of the European Union for the Development of Scientific Research and Technology "Horizon Europe".

A contract was signed for the provision of services for the UNESCO Office in Uzbekistan to carry out work on the analysis of the scientific, technical and innovative potential of the regions of Uzbekistan within the framework of the UNESCO IsDB project *UNESCO Global Observatory of Science, Technology and Innovation Policy Instruments Towards Strengthening Inclusive Science, Technology, Innovation Systems for the Sustainable Development Goals*.

For the first time in the country, the project "English for Science" was launched, under which free training courses were organized, aimed at improving the knowledge and skills of domestic scientists and researchers in the English language.

In general, this Center already today has all the prerequisites to become the leading intellectual agency in the field of science and innovation in the Central Asian region, and is able to provide a full range of information and analytical services at the international level.

STRENGTHENING ~~OF FUNCTIONS ON~~ THE DEVELOPMENT OF SCIENCE AND INNOVATIONS OF REGIONAL ADMINISTRATIONS

Strengthening the development of science and innovations of regional administrations

Today, there are 72 departments of commercialization, 62 innovation structures, as well as 94 research Institutes and centers at 91 higher educational institutions of the country. The Ministry implements 1,233 scientific projects totaling 385.42 billion UZS and 27 innovation investment projects for a total amount of 140.47 billion UZS.

In order to accelerate innovative development of the regions of the republic in the structure of regional khokimiyats (administration office of local executive body) and Tashkent city at the governmental level was decided to establish the Department of innovative development, the main objectives of which are:

- Direct assistance in the organization and operation of innovative infrastructure (technology transfer centers, small innovative enterprises, business gas pedals, business incubators, technology parks, etc.) in the regions;
- Coordination of development and implementation of concepts and programs of innovative development of the regions;
- Working out of the programs for increase of the scientific potential of the regions on the basis of formation of the fundamental, applied and innovative scientific projects;
- Organization and support of innovation information systems for providing the innovation support of business entities, including small businesses in the region;
- Implementation of effective mechanisms for organizing the integration of education, science and production;
- Promotion of cooperation between innovators and production enterprises;
- Organization of exhibitions, fairs of innovative products; scientific-practical seminars and conferences, including training courses on patenting and licensing of academic papers;
- Implementation of measures aimed at increasing economic and innovative competitiveness of the region, including the introduction of advanced modern technologies in the production of import-substituting and export-oriented products; preparation of sound proposals for the organization of production on the basis of localization and orientation to economic development.

Conclusion

The analysis and detailed study of the situation of scientific and innovation activities development conducted within the framework of this project in regions has showed that the state has taken initial measures to create favorable conditions for scientists and researchers in the field. At the same time, the most important problem remains a significant lag and a gap from the capital - the city of Tashkent.

After the visits to the regions, the problems associated with the implementation of state support for innovation activities that require effective solutions were identified.

The first and probably the main problem in the regions is the low level of scientific projects proposed by scientists. Entirely, this problem has a number of reasons and entails rather serious negative consequences. Thus, in a number of regions, interviews with scientists have revealed a poor awareness of the mechanisms of state support of scientific and innovation activity being implemented in the country, including other regions. Applications from the regions that are sent to the Ministry of Innovative Development have weak substantiation of the necessity of their implementation, and the composition of research groups loses considerably to the organizations in the capital. The same applies to the reporting documentation submitted to the Ministry on the results of projects implementation. In most cases, scientists ignore the nationally accepted standards for the preparation of reports. As a result, the information reflected in the reports does not disclose sufficiently the potential of the results of scientific and technical activity in order to assess the possibility of their further involvement in the innovation process.

Obviously, this situation must be addressed through the active implementation of explanatory, training activities. The seminars on writing scientific publications and preparing scholarship applications held as part of the project showed a high interest of scientists from the regions in obtaining new additional knowledge and strengthening their own competencies. Also, it makes sense to consider the announcement of special regional grant programs, taking into account their potential and the application of specific selection criteria. Financing of scientific and innovative activity in most regions is extremely low.

Secondly, there is no unified information space providing all participants of the innovation process with actual, reliable and full information on the situation in the field of science and innovations.

Visits to universities and scientific organizations in different regions revealed a number of similar scientific projects and research topics. Also, weak interaction between scientists and a lack of scientific collaborations between regions were revealed. Scientists from the regions are practically not involved in projects implemented by organizations in the capital.

It is necessary to work more actively in this direction. The initiated work of the Center for Scientific and Technical Information requires further development and scaling at the national level with the creation of the National Scientific Web Portal and the involvement of as many scientists across the country as possible.

Third. Scientific organizations are very rarely represented in the regions. Most of the scientific and innovative activities in the regions are implemented by universities.

At the same time, the universities themselves are equipped only with training laboratories, the equipment of which does not allow to carry out scientific work and experiments at the proper level.

CONCLUSION

Fourth. An important problem, according to scientists from the regions, is weak feedback from both the central state and local executive authorities, and from industrial enterprises. Proposals sent by scientists often remain unanswered.

As it was noted in the main part of the review, the Ministry of Innovative Development and regional khokimiyats have already started working on it. It is necessary to actively develop this activity, to hold events (forums, exhibitions, etc.) in the regions with a more frequency, aimed to strengthen the integrity between science and production.

Webinars were organized for domestic scientists and researchers in order to improve the quality of preparation of scientific articles by Uzbek scientists for publication in international journals indexed by the Scopus and Web of Science databases. During the webinars, a number of problems faced by scientists and graduate students were identified.

One of the most frequent problems encountered among scientists is how to attract attention of well-known scientific publications with their publications. A brief survey of the topics on which scientists in the social disciplines work showed that most of them are not in significant demand in cutting-edge scientific journals. One of the reasons is the use of their own articles or outdated literature when preparing research for a journal. Scientists cite extremely few articles from leading journals and research published in the past few years. Together, this leads to the fact that their topics do not always correspond to those published in the journals Scopus and Web of Science.

Another problem is ignorance of the structure of the article, which is necessary for publication according to the requirements of the journal. Thus, most scientists in their articles often do not include such sections as literature review, data, stability testing, etc. In the modern empirical literature, the need for an in-depth review of the literature, working with large amounts of data and using advanced scientific methods of data analysis has increased significantly. The absence of such elements significantly reduces the chances of an article being published. For example, articles on economics or sociology should include 4-8 tables with calculations.

Foreign journals require the creation of a clear structure with the designation of individual parts of the work. Even when uploading an article electronically to the website of a foreign journal, including one reviewed in Scopus and Web of Science, it is often required to upload each section of the work in a separate file.

Most scholars do not have extensive experience with peer-review programs and do not have the technical skills to work with programs when preparing articles. The journals have certain requirements for the style of reviewing, font size, tables and graphs. Scientists often ignore these requirements, which prevents them from publishing their articles in journals.

Poor knowledge of English in its direction when writing articles is one of the significant problems. Thus, scientists do not perfectly possess the necessary scientific terminology in their direction when writing articles. Moreover, scientists do not use peer-review services and programs when writing scientific articles. Lack of skills in the use of academic English when writing articles is closing the way for publication in leading foreign journals. One of the solutions could be the creation of academic English courses for scientists in their fields.

CONCLUSION

Most scientists lack the necessary skills to conduct empirical research. In empirical analysis, they often use descriptive or correlation approaches, while over the past 10 years in science, the demand for scientific articles using more advanced methods of analysis such as General method of moments, Cointegration, Fixed effect and random effects, and others has increased significantly. Consequently, the use of simpler methods of analysis significantly reduces the quality of scientific research. One solution may be to study more deeply the methods of scientific analysis.

Also, in order to form the readiness of the audience to independently analyze the sources of grant funding, form partnerships for submitting applications, structure and write applications, manage grant financing projects with a focus on further systemic activity in the field of foreign grant financing of R&D and the subsequent commercialization of technologies, a series of webinars was held with the involvement of a foreign expert.

Based on the results of the webinars, communication with the participants, the following conclusions were formed:

The general level of knowledge of technology developers of the Republic of Uzbekistan in research Institutes and universities about research funding programs, the principles of their formation and operational activities has significantly increased over the previous 2 years. Some participants already have preliminary / working agreements with foreign (European) partners for joint research and application for grant funding.

Even compared to the situation at the beginning of 2020, more participants are asking questions about the further use of the results obtained (commercialization of developments).

However, the developer community is largely focused on receiving grants as a way to meet their own needs (a grant is seen as an analogue of a salary), substituting for this participation in the full value chain.

Among the employees of the research Institute there are very active and ambitious professionals who are constantly raising their level and are focused on the development not only of their own research areas, but also on the formation of the research Institute's technology portfolio. It is these (often commercially oriented) employees of research Institutes that can become the pillars of the formation of high-tech businesses and technology transfer to the real sector of the economy.

Quite a lot of researchers in non-technical fields (history, philology, etc.) are interested in participating in grant competitions.

It is extremely important to control / check / audit the level of knowledge and professional achievements of the Research Institute of the Republic of Uzbekistan (technological audit, formation of intellectual property portfolios, etc.). In this case, the metrics for assessment should be objective economic indicators: a measure of impact on the economy, job creation, the share of high-margin industries in the economy, etc. Ultimately, this will lead to the creation of a steady flow of investment in the scientific and technological sector of the state.

The organization of the national acceleration program of the Republic of Uzbekistan for technology developers is categorically important. The basis for the formation of a national acceleration of developments is important - the interaction of scientific and technical specialists from universities / research Institutes with representatives of industry and business (ideally, with those who have completed a training program abroad).

CONCLUSION

It makes sense to introduce technology developers as soon as possible to the principles of venture (equity) financing of high-tech companies (startups); this will allow - against the background of an active entrepreneurial environment - to form a pool of national innovative businesses and a community of technology entrepreneurs (which, in turn, will significantly simplify integration into the global business community and, as a consequence, the development of high-tech exports. In particular, such a practice can be based on interaction with existing private business and the financial sector.

It is critical to provide ongoing English language training to scientific and technical workers.

It is advisable to consider the possibility of informational global expansion of the scientific community; first of all, this can be realized through the creation of Internet resources (sites) for research Institutes and research universities.

Any intensive training must be carried out with departure from the place of compact residence of the students. This allows you to fully focus on the material and optimize your program. In addition, depending on the dynamics of information perception, the program can be expanded to other relevant areas: technology commercialization, investor relations, patent research, etc.

In general, the work is carried out in Uzbekistan for the first time and is aimed at implementing the innovation policy adopted in the country, ensuring structural reorganization in the economy and orientation towards the market of science-intensive and competitive products.

At the same time, the issue of strengthening the scientific, technological and innovative potential of the regions, reducing its significant lagging behind the capital - the city of Tashkent – is heavy emphasis on today's agenda.

All these tasks clearly require a systematic approach and the involvement of specialists.

In this connection, as a continuation of the work already conducted, guided by the main conclusions drawn within the framework of "Strengthening an Inclusive System of Science, Technology and Innovation in Uzbekistan" the joint UNESCO/IBD project (UNESCO-IsDB project UNESCO Global Observatory of Science, Technology and Innovation Policy Instruments (GO→SPIN) towards strengthening inclusive Science, Technology, Innovation (STI) Systems for the Sustainable Development Goals), and also taking into account the expert recommendations, it is proposed to bring the project to a new stage by establishing a "Central Asian Hub for Innovative Development" with its headquarters in the city of Tashkent.

Nowadays, creation of effective innovation system with formation of professional body of managers (representatives) meeting all modern requirements is one of the key factors for provision of structural reorganization in economy and orientation to the market of knowledge-intensive competitive production of each country of the Central Asian region. As world experience shows, the synergistic effects of cooperation between the countries of these or other regional associations can not only reduce the technological gap between them, but also more effectively solve other problems.

The countries of Central Asia have great potential to form a cross-border space for the transition to a knowledge-based economy.

CONCLUSION

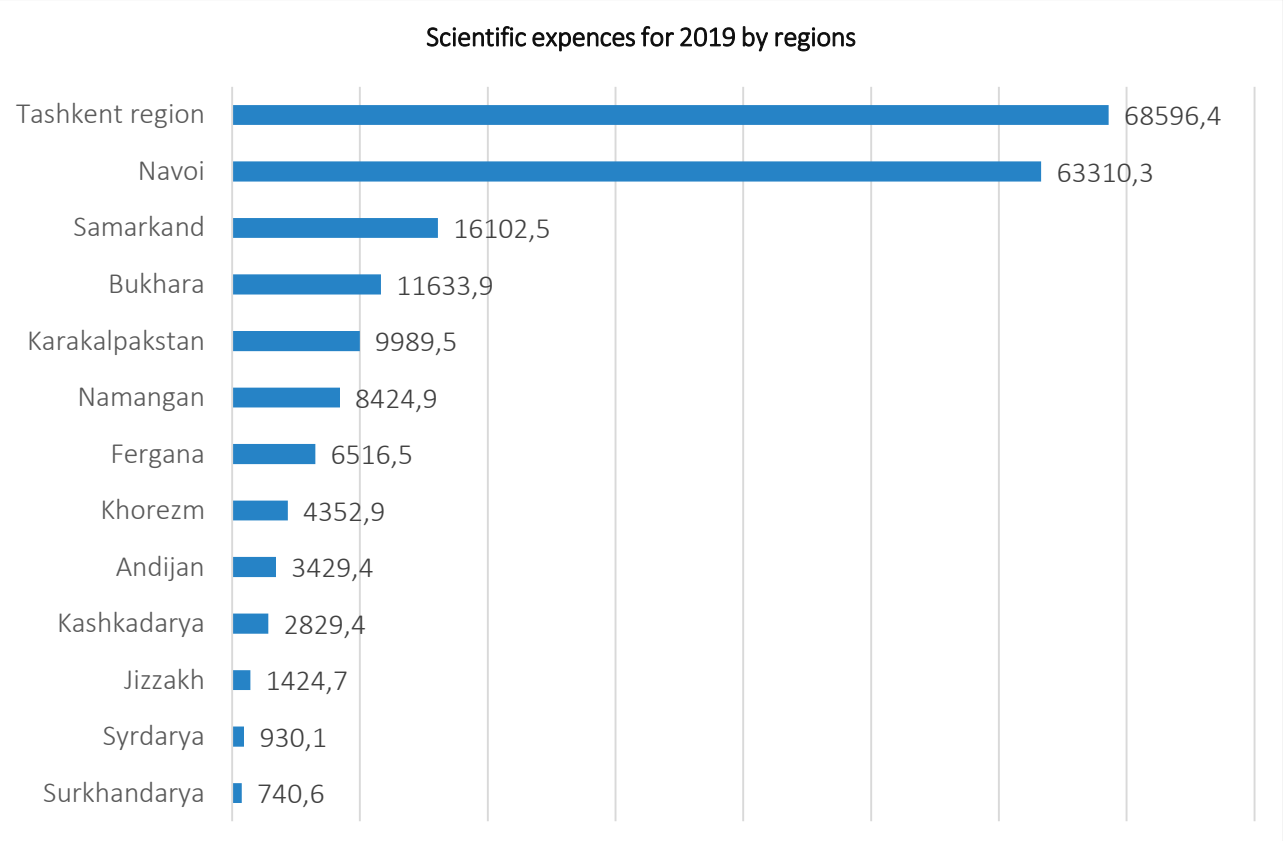
The authors of this review believe that the creation of a regional hub as an international platform for integrating efforts and systematization exchange of specialists, knowledge and experience in innovation will accelerate the achievement of sustainable results of the adopted reforms, open new opportunities for a more comprehensive management of science, technology and innovation system, and build research capacity in the countries of the region.

Also, the Hub will play an important role in strengthening bilateral and multilateral cooperation in innovation, both among countries in the region and beyond.

Appendix 1

Scientific expences for 2019 by regions[4]

№	Region	Expenses (mln. sum)
1.	Surkhandarya	740,6
2.	Syrdarya	930,1
3.	Jizzakh	1424,7
4.	Kashkadarya	2829,4
5.	Andijan	3429,4
6.	Khorezm	4352,9
7.	Fergana	6516,5
8.	Namangan	8424,9
9.	Karakalpakstan	9989,5
10.	Bukhara	11633,9
11.	Samarkand	16102,5
12.	Navoi	63310,3
13.	Tashkent region	68596,4

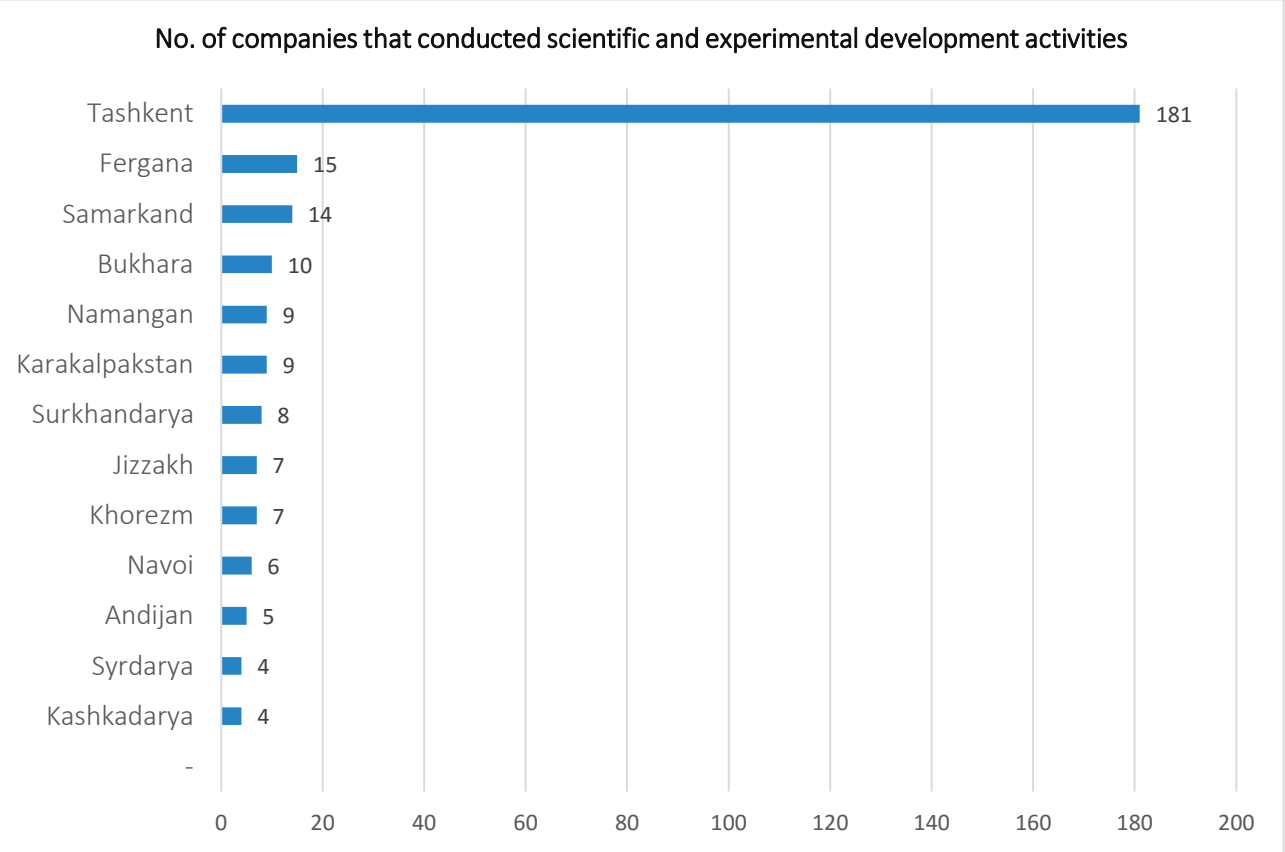


[4] Statistical bulletin. State Committee of RUz of Statistics, 2020

APPENDIX 1

No. of companies that conducted scientific and experimental development activities[5]

№	Region	No. of companies
1.	Kashkadarya	4
2.	Syrdarya	4
3.	Andijan	5
4.	Navoi	6
5.	Khorezm	7
6.	Jizak	7
7.	Surkhandarya	8
8.	Karakalpakstan	9
9.	Namangan	9
10.	Bukhara	10
11.	Samarkand	14
12.	Fergana	15
13.	Tashkent	181

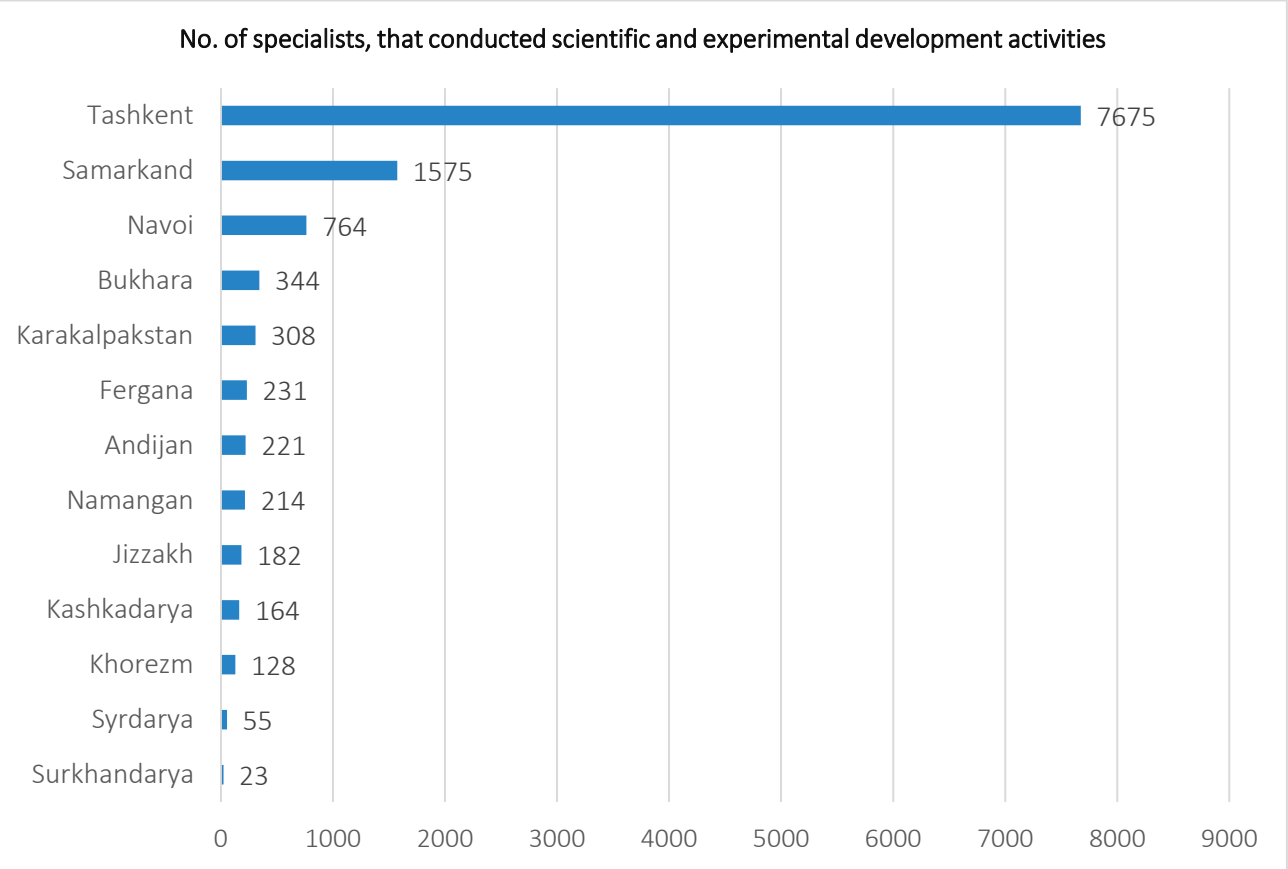


[5] Statistical bulletin. State Committee of RUz of Statistics, 2020

APPENDIX 1

No. of specialists, that conducted scientific and experimental development activities [6]

№	Region	No. of specialists involved in the scientific and experimental development activities
1.	Surkhandarya	23
2.	Syrdarya	55
3.	Khorezm	128
4.	Kashkadarya	164
5.	Jizak	182
6.	Namangan	214
7.	Andijan	221
8.	Fergana	231
9.	Karakalpakstan	308
10.	Bukhara	344
11.	Navoi	764
12.	Samarkand	1575
13.	Tashkent	7675

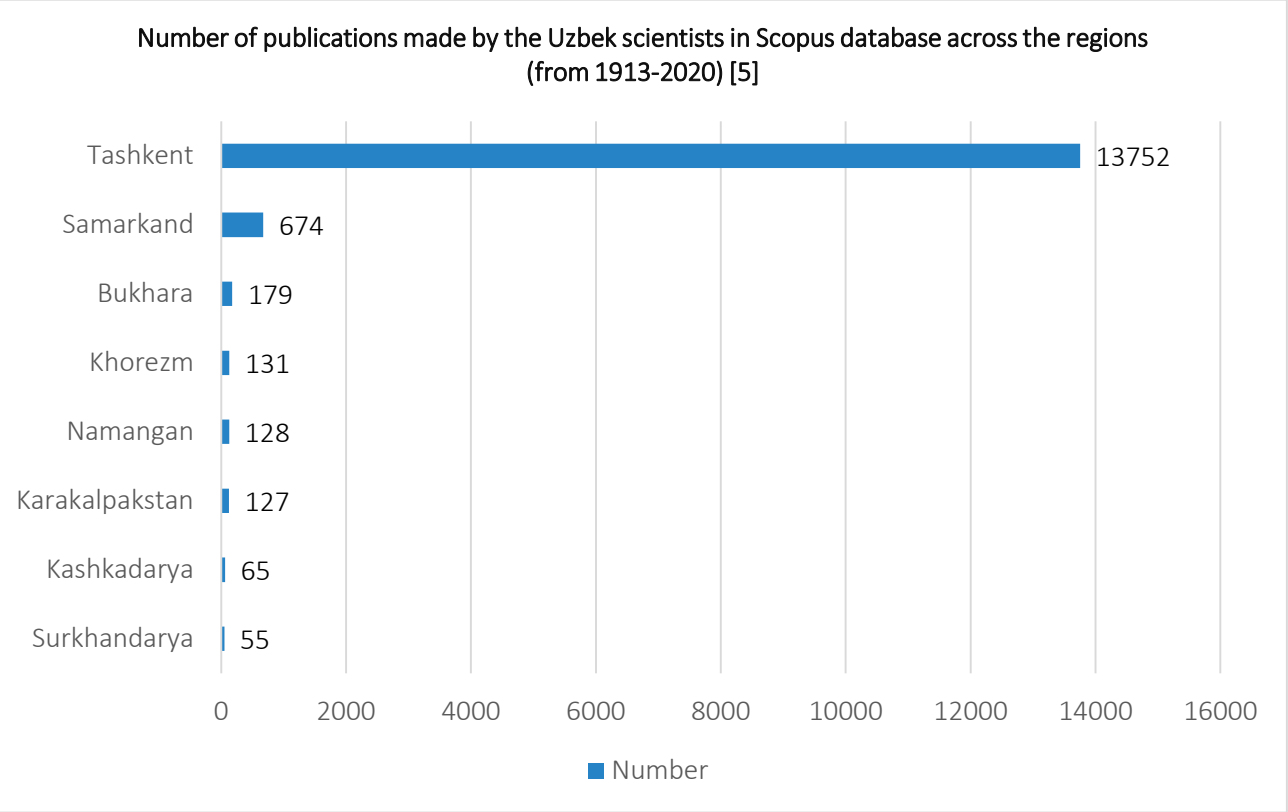


[6] Statistical bulletin. State Committee of RUz of Statistics, 2020

APPENDIX 1

Number of publications made by the Uzbek scientists in Scopus database across the regions (from 1913-2020)[7]

No.	Region	Q-ty
1.	Surkhandarya	55
2.	Kashkadarya	65
3.	Karakalpakstan	127
4.	Namangan	128
5.	Khorezm	131
6.	Bukhara	179
7.	Samarkand	674
8.	Tashkent	13752

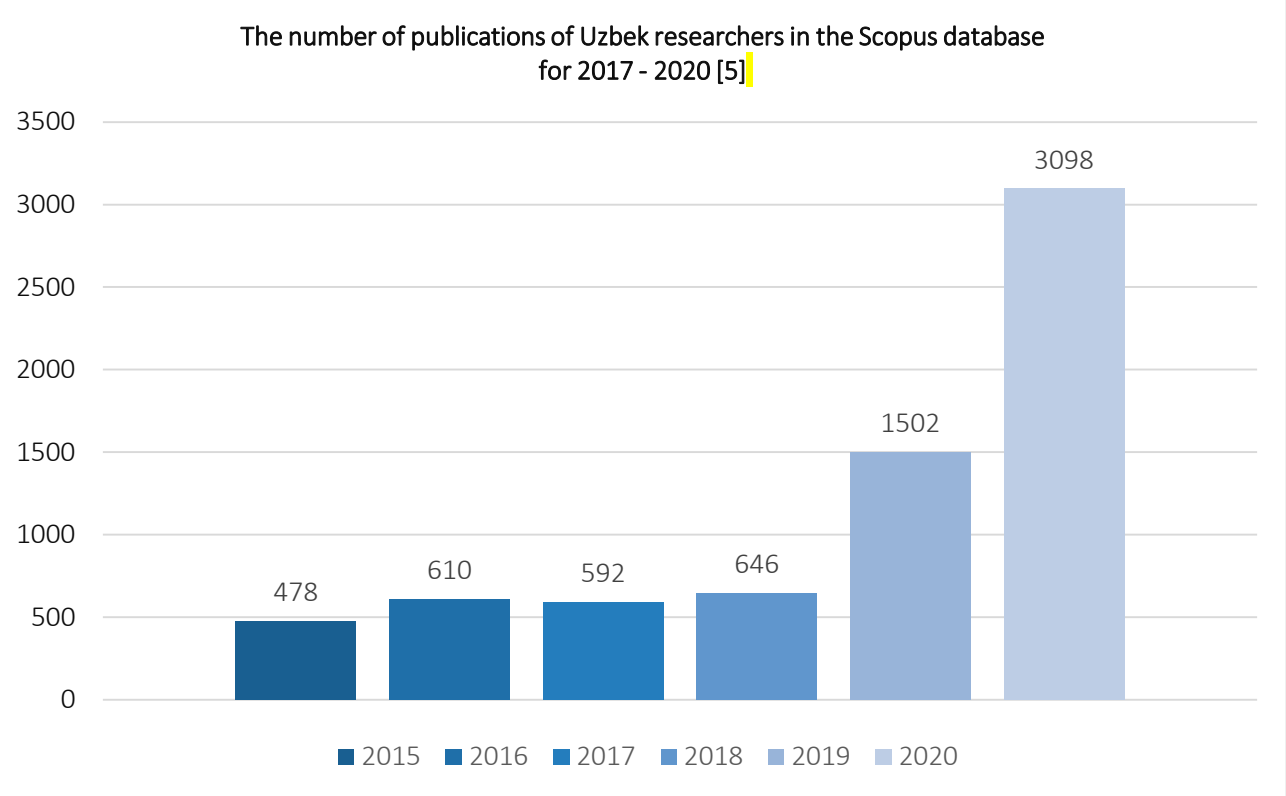


[7] Scopus official website. https://www.scopus.com/home.uri?zone=header&origin=AuthorProfile

APPENDIX 1

Number of publicaions made by the uzbek scientist in Scopus db for 2017 – 2020[8]

Country/year	2015	2016	2017	2018	2019	2020
Uzbekistan	478	610	592	646	1502	3098



[8] Scopus official website. https://www.scopus.com/home.uri?zone=header&origin=AuthorProfile

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