



MINING – METALLURGICAL
INSTITUTE OF TAJIKISTAN



UN
2023 WATER
CONFERENCE

NEW YORK
22-24
MARCH
2023

CONTRIBUTION OF SCIENTISTS OF THE MINING - METALLURGICAL INSTITUTE OF TAJIKISTAN TO SOLVING GLOBAL WATER PROBLEMS

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The Mining - metallurgical Institute of Tajikistan (MMIT) is one of the main academic institutions of the mining and metallurgical direction in the Republic of Tajikistan, is a multidisciplinary higher technical educational institution.

It mainly specializes in training personnel in the development, processing and operation of mineral deposits, metallurgy, mechanical engineering, mining, industrial ecology and environmental engineering.

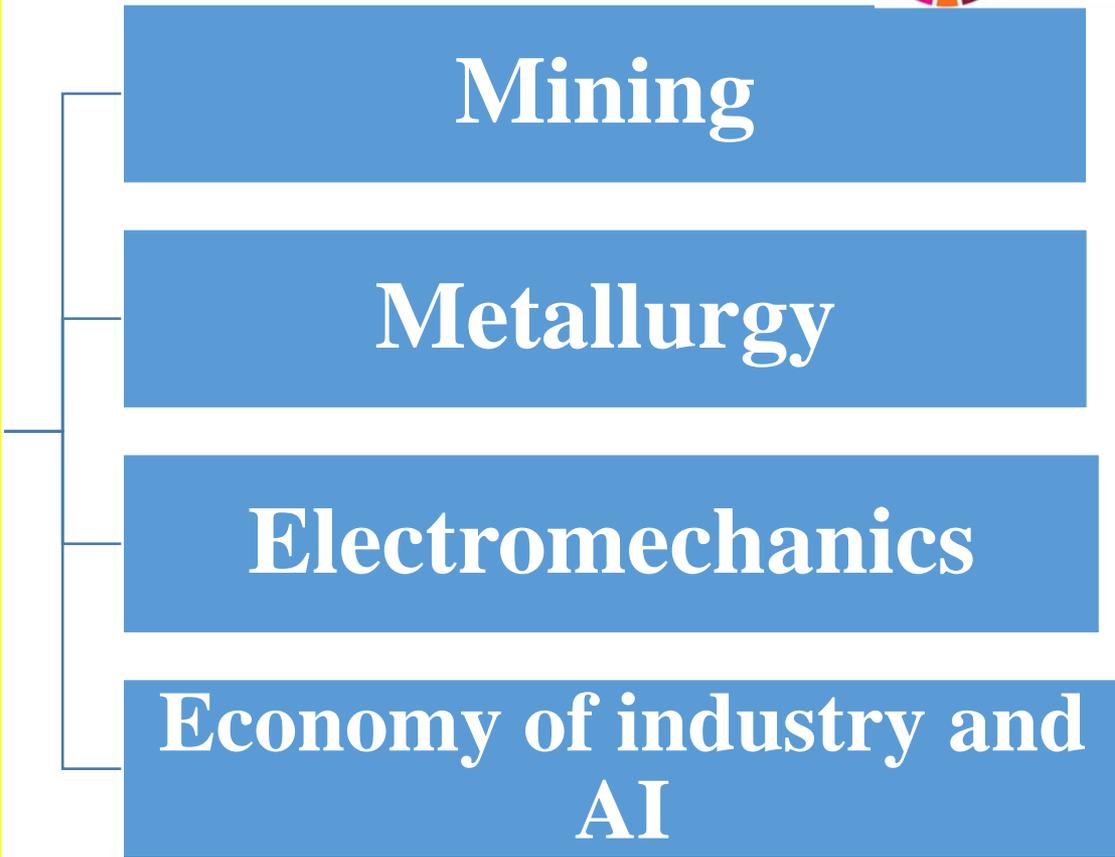
The main areas of research of MMIT: **mining, metallurgy, engineering ecology, industrial ecology, management and purification of water resources, climate change and energy effectiveness**



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Faculties



www.gmit.tj



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Departments: 16

Ecology

Metallurgy

Power supply

Geology and oil and gas business

Development of mineral deposits

Engineering technology

Natural science disciplines

Construction and engineering graphics

General technical disciplines

Climate change will affect the availability, **quality and quantity** of water resources needed to meet basic human needs. Hydrological changes driven by climate change may further complicate the problems and challenges to sustainable water management that are already under severe pressure in many regions of the world.



Initiatives of the Republic of Tajikistan on water issues (at the beginning of the millennium, the initiative of the republic),

At the initiative of the President of the Republic of Tajikistan, Emomali Rahmon, resolutions of the UN General Assembly were adopted on the rational use of drinking water.

- In 2003, the announcement of the "International Year of Clean Water".
- 2005-2015 International Decade for Action Water for Life
- 2013 - International Year of Water Cooperation
- "Water for sustainable development for 2018-2028",
- 2025 - International Year for the Protection of Glaciers, on December 14, 2022, the UN General Assembly adopted a resolution.



With this in mind, although the institute does not have a specialized department for water treatment, water supply, scientists from our institute took part in several projects

International research projects on Water

- **«Assessment of transboundary water pollution in Central Asia”, Science for Peace Program (2011-2015);**

Purpose: To track the concentration of 9 key heavy metals in the Syr Darya River, to assess the level of pollution and their transboundary transfer to the CA countries. Lay the groundwork for a permanent joint monitoring program in the region.

- **Water Harmony (2011-2015);**

- **Water Harmony Eurasia II, Norway (2015-2019-2022);**

Goal: improving the quality of education and scientific and pedagogical skills of teachers of higher educational institutions in matters of water management.

- **Integrated water resources management and strategic environmental assessment of Kabul and Amu Darya rivers, (2016-2019);**

Purpose: exchange of experience in the implementation of Integrated Water Resources Management. Creation of maps of soils, vegetation according to the obtained data of scientific research.



"ASSESSMENT OF TRANSBOUNDARY WATER POLLUTION IN CENTRAL ASIA", Science for Peace (2012-2016); SfP Program

Project stages

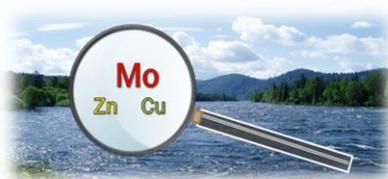
Phase 1: Preparation and Education;

Phase 2 : Field sampling, data collection and chemical analysis;

Phase 3 : Implementation and continuation of the monitoring program in cooperation with end users (sustainable development).

Nine trace elements to study

- Chromium
- Nickel
- Copper
- Zinc
- Arsenic
- Molybdenum
- Cadmium
- Lead
- Mercury

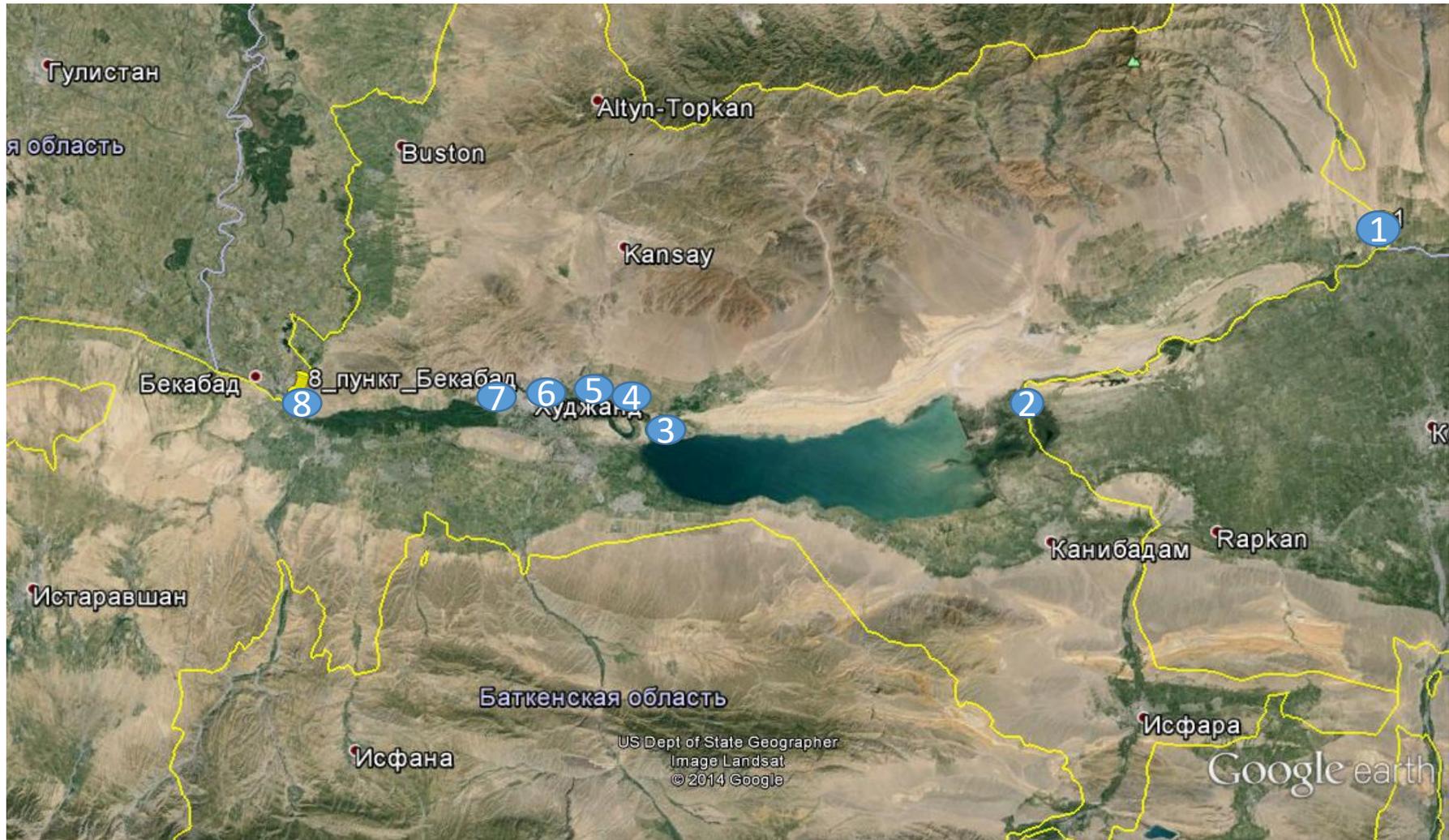


Express analysis

- *Dissolved oxygen*
- *pH*
- *Conductivity/resistivity*
- *Salinity*
- *Temperature*
- *Redox potential*



Sampling points in the Republic of Tajikistan

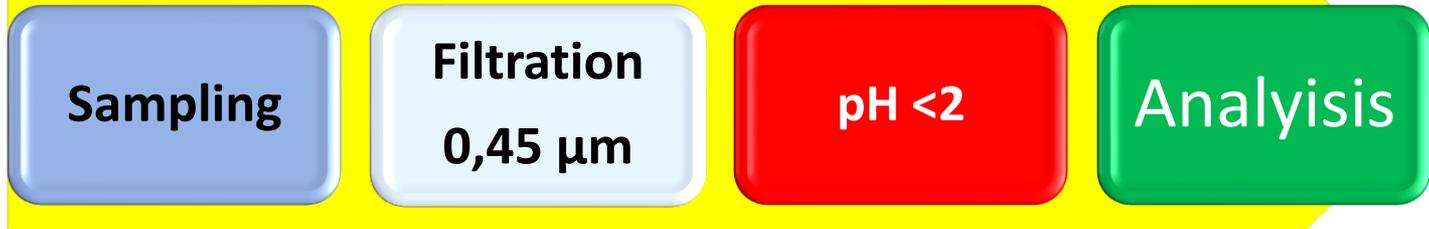




Field work / Sampling



Stages: from sampling to analysis



Atomic absorption spectrometer Analyst 800



Cyber Scan PCD 650

Analytical laboratories of MMIT



INTERNATIONAL CONFERENCES AND SEMINARS



Projects results

- A unique analytical laboratory was created at MMIT (water quality);
- Use of research results in solving interstate issues on water problems.
- The book “Water Resources Management. Physico-chemical methods of water purification” with the participation of the Project participants in 5 languages, incl. in Tajik (the volume of each edition is more than 650 pages). (distributed to all libraries of the republic, ministries, universities)
- 2 collections of works of project participants on water projects were published.
- Scientific publications were published based on the results of studies > 40, 6 Ph.D. dissertations. 30 int. workshops and conferences on water problems.
- Annual internship for students and teachers in Norway.

Based on the results of scientific research related to water problems, using equipment received from international projects, 6 Ph.D. theses were defended: Including:

- Dynamics of distribution of heavy metals in the Syrdarya River on the territory of the Republic of Tajikistan;
- Purification of mine waters from heavy metals by coagulation (on the example of the Capital mine)
- Physical and chemical bases of mine water purification from heavy metals on the example of the Vostochnaya mine
- Wastewater treatment of fastening materials production from heavy metals (on the example of Tajfiliz LLC)
- Forecasting watering of the bottomhole zone of gas wells based on transition functions and hydrodynamic models;

More than 50 research works in Bachelor degree were also completed.

Water Harmony Project



Our students in Norway
Annually 2 students from MMIT
Until today 20 students



Project Water Harmony II - Eurasia (2015-2019-2022).

The project is closely related to educational activities, the main goal is to improve the **quality of education** and **the scientific and pedagogical skills** of teachers of higher educational institutions in matters of **water management**.

The project helped our institute to strengthen cooperation with more than ten Universities in Europe and Asia, contributed to equipping the laboratory with equipment for measuring water quality, studying water treatment methods and purchasing office equipment, as well as passing summer internships for our students at the **Norwegian University of Life Sciences (NMBU)**.

Project Water Harmony II - Eurasia (2015-2019-2022) participants

Norwegian University of Life Sciences Os, Norway

Ukrainian State University of Chemical Technology Dnipro, Ukraine

National Technical University of Ukraine "Kyiv Polytechnic Institute" Kyiv, Ukraine

South Kazakhstan State University. M. Auezov Shymkent, Kazakhstan

Belarusian State Technological University Minsk, Belarus

Technological University of Moldova Chisinau, Moldova

Cherkasy State Technological University Cherkasy, Ukraine

Kyrgyz National University named after Zhusup Balasagyn Bishkek, Kyrgyzstan

National University of Water Management and Nature Management Rivne, Ukraine

Mining - metallurgical Institute Tajikistan Buston, Tajikistan

Tajik Technical University named after acad. M. Osimi, Dushanbe, Tajikistan

Project Water Harmony II - Eurasia (2015-2019-2022).

This project gives our students the opportunity to have a summer internship at a very prestigious university in the world, gain new knowledge, get acquainted with the latest water purification technologies, expand their worldview, get acquainted with the latest achievements of modern science, and allow them to focus on those areas of study that they will need in the future. .



After completing the courses, students continue the practical part of the course work using modern programs for assessing water resources, making calculations for water supply and sanitation in the conditions of our country. Until the end of October of year, the results of their scientific work must be sent to the NMBU and defended. The best entries will be published in NMBU publications.

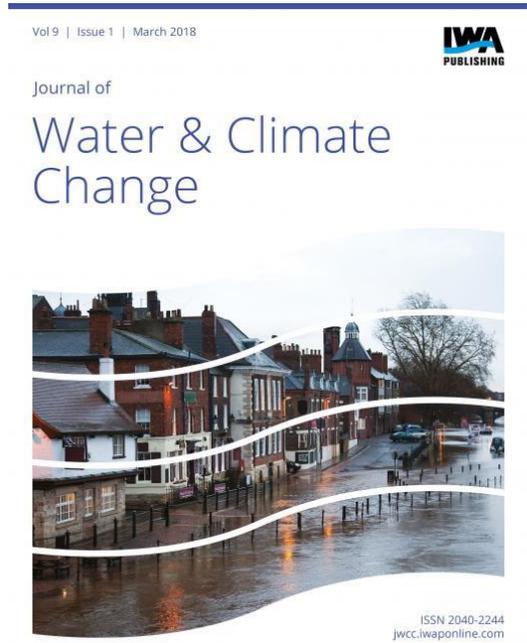


The International Water Association

From 2018 MMIT is a member



The mission of this organization is to bring together the world's best experts in the field of water management, as well as the development and implementation of effective solutions that contribute to the conservation of water resources in the world (8 teachers are full members of this association)



The International Water Association

WDCE 2019 - IWA Water and Development Congress

Under the Water Harmony Eurasia II project in 2019, representatives of the MMIT participated and spoke at the World Water Congress in Sri Lanka, Colombo.

The theme of the Water Congress was Sustainable Solutions for Emerging Economies and in the meeting on the above project.



Ongoing research projects

Since 2021, the teaching staff began research on the Project

To study the water quality of transboundary rivers in the Sughd region

For the first time, the water quality of transboundary rivers was studied using 27 typical indicators, which made it possible to determine the mass of transboundary transport of a number of pollutants entering Tajikistan with the runoff of these rivers.



Главное Управление
охраны окружающей
среды Согдийской области



National
Water Resources
Management Project
HELVETAS ACTED giz



Financed by:
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
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Swiss Confederation
Конфедератсия Швейцария



Ongoing research projects

Since 2022, the faculty, including 5 students, have begun research on the Project

COP4WASH in Central Asia

PURPOSE OF COOPERATION: Development of a community of researchers and practitioners in the field of Water Supply, Sanitation and Hygiene in Central Asia (WASH in CA)

COP4WASH in Central Asia

- **Field studies**
- **Collection of materials for analysis**
- **Performing drinking water analyzes**
- **Systematization of results**

Joint workshop - March 17, 2023



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НАУЧНО-ПРАКТИЧЕСКИЙ СЕМИНАР

Тема: «ЦУР №6 – ускоряя преобразования».

Посвященная Всемирному Дню Водных Ресурсов и Водной Конференции ООН который состоится 22-24 марта 2023 года в г. Нью-Йорке под председательством Республики Таджикистан и Королевства Нидерландов



Benefits of participating in projects

- *Improving the material and technical base of the institute, equipping the laboratory with the **latest equipment**;*
- *Acquisition of skills in working with **advanced technologies** and equipment;*
- *Strengthening scientific ties **with foreign universities**, exchange of experience with partners;*
- *Increasing **students' knowledge** of the latest wastewater treatment technologies and water management;*
- *Expansion of the **worldview of the teaching staff** and students, exchange of experience with foreign educational institutions;*

2022 - Summer internship for students. Advanced training of teaching staff (Norway)

Cybersecurity in the water sector and other workshops.



2022 - Summer internship for students. Advanced training of teaching staff (Norway)

Underground water treatment plant (for the population of 100 thousand people)



2022 - Summer internship for students. Advanced training of teaching staff (Norway)



2022 – International conference



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2022 – International conference - Buston



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The main strategic directions of the MMIT activity on water issues until 2025:

- Ensuring a **high level** of research work;
- **Participation in international research** and educational projects;
- Opening of **additional English language** courses in the field of **environmental engineering**;
- Internationalization of educational and scientific activities through participation in **international projects** and programs;
- Attracting students **to research work** and participation in scientific circles;