

## Brief information about the program

Name of the program	BR21882122 “Sustainable Development of Natural-Industrial and Socio-Economic Systems of the West Kazakhstan Region in the Context of Green Growth: A Comprehensive Analysis, Concept, Forecast Estimates and Scenarios” (0123PK01214)
Relevance	<p>Sustainable development of regions in Kazakhstan is currently one of the priority tasks, as dynamically developing and competitive, they represent a source of population welfare growth, a foundation for implementing national policies to reduce regional disparities, and facilitating a more balanced and sustainable development of the republic. Western Kazakhstan, possessing significant economic potential, risks losing stability in its future ecological-social-economic development due to the existing economic model of irrational natural resource use, ongoing ecological and natural, socio-demographic processes. Key tasks for the region include reducing environmental stress, poverty, increasing the employment level of the working-age population; forming a rational (more uniform) settlement system; preserving biodiversity through the restoration of the region's disturbed water resource balance; and rational use of natural resources.</p> <p>In this context, the main idea of the program is to form a complex of indicators characterizing the sustainability of the ecological-social-economic development of the Western Kazakhstan Region (WKR) and to assess on their basis the demographic potential, economic growth, social well-being, underground and surface water resources, the population's provision with water and biological resources, air basin quality, soil pollution, contamination of underground and surface freshwater and marine waters, the degree of degradation of flora and fauna, desertification level, identifying the tourist potential of WKR, using created geodata bases and digital thematic maps.</p> <p>The bioresource potential of ecosystems is not fully utilized, necessitating in-depth analysis and foresight research to determine paths for long-term development and making informed management decisions.</p> <p>A strategic task is to create a comprehensive methodology and toolkit for the systematic assessment and management of the quality of natural-economic systems, monitoring environmental components of the studied region and their impact on population health based on environmental quality management recommendations and scenario assessments aimed at achieving sustainable development of the region.</p> <p>Within the framework of the program, comprehensive ecological-economic-sociological, hydrogeological studies will be conducted, including the survey of all significant environmental components, as well as studying their impact on the ecosystem. Major pollution sources will be identified, and an analysis of industrial emissions and their impact on environmental quality and population health will be conducted. These data will be used to develop models and methods for pollution assessment and determining the most critical zones.</p> <p>This will allow for a more accurate, high-quality, and systematic basis for risk assessment, applying preventive measures to minimize them, developing effective strategies to counteract environmental degradation,</p>

	<p>and ensuring the improvement of the environmental situation in the region.</p> <p>Based on the analysis and assessment of environmental challenges and threats in the natural-economic systems of WKR, a comprehensive set of measures for managing their environmental safety will be proposed.</p>
Purpose	<p>Conduct comprehensive studies on ensuring sustainable development of the natural-economic and socio-economic systems of the Western Kazakhstan Region (Mangystau, Atyrau, West Kazakhstan, and Aktobe regions) in the context of green growth.</p>
Objectives	<ol style="list-style-type: none"> <li>1. Develop methodological foundations and conduct an assessment of the natural-resource potential (NRP) based on a series of informational-assessment maps, valuation of natural capital and ecosystem services, forecast assessments of NRP dimensions, and a series of predictive-recommendation maps based on remote sensing data and field observations, along with actions for the conservation and restoration of NRP.</li> <li>2. Assess the biodiversity of the Western Kazakhstan Region using a database and biodiversity assessment methods considering their current state, conducting inventories, creating informational-assessment maps, as well as scenarios for expected changes in biodiversity (marine and terrestrial) for predictive-recommendation maps and developing an action plan for the conservation of rare and endangered species of animals and plants while sustainably using existing bioresources.</li> <li>3. Evaluate the air quality of the Western Kazakhstan Region based on a database, assessment methodologies, inventory efforts, and creating a series of informational-assessment, predictive-recommendation maps to develop scenarios for expected changes and an action plan to improve the region's air basin.</li> <li>4. Assess soil pollution by toxic chemicals in the WKR due to industrial activity based on a database and soil pollution assessment methods, a series of informational-assessment maps, analysis of developed scenarios for expected soil contaminations, and develop an action plan to prevent pollution with toxic chemicals along with a series of predictive-recommendation maps.</li> <li>5. Evaluate the ecological state of surface and groundwater in the Western region based on a database, assessment methodologies for the quality of surface and groundwater (SWGW), informational-assessment maps, develop scenarios for expected changes in SWGW quality, and an action plan for improving the quality of waterways with a series of predictive-recommendation maps.</li> <li>6. Develop methodological approaches and, based on them, assess the landscape-ecological state of the Western Kazakhstan Region, including using a database (natural-economic-ecological block), evaluating the current eco-state of the landscape structure and anthropogenic disturbances, developing a series of informational-assessment and recommendation maps, requirements, and actions aimed at stabilizing NRP and the eco-state of landscapes.</li> <li>7. Conduct an assessment of the socio-economic development of the Western Kazakhstan Region based on an analysis of demographic, social, economic, and tourist potential, followed by the development of forecast options and suggestions for local authorities on</li> </ol>

	<p>implementing tools and mechanisms for sustainable development and green growth.</p> <p>8. Develop scientific-applied foundations for ensuring the sustainability of natural-economic systems and socio-economic development of the Western Kazakhstan Region in the context of sustainable development and green growth, which will be reflected in comprehensive thematic and analytical maps of natural-economic resources in the WKR, presenting scientifically-based actions for the conservation and restoration of natural-economic resources.</p>
<p>Expected and achieved results</p>	<p>A comprehensive current assessment and forecast of changes in the natural resource potential, as the main factor in the development of the natural-economic systems of the Western Kazakhstan Region (WKR), will be provided, including the development of a scenario and actions for the conservation and restoration of natural resource potential.</p> <p>An assessment of the region's biodiversity in the context of sustainable development and green growth will be obtained, including the development of a database and informational-assessment maps, scenarios of expected changes, and plans for the conservation of the region's biodiversity.</p> <p>An assessment of the region's air quality will be conducted, including an inventory of objects, development of a database, scenarios, informational-assessment, and predictive-recommendation maps;</p> <p>An assessment of the region's soil pollution by toxic chemicals as a result of industrial activity will be provided, including the compilation of a database, a series of informational-assessment maps, scenarios, plans, and predictive-recommendation maps.</p> <p>An assessment of the pollution of surface and groundwater in the region will be provided, including the creation of a database, informational-assessment and predictive-recommendation maps, scenarios of expected changes, and action plans.</p> <p>Evaluations of the landscape-ecological state of the region, landscape structure, and anthropogenic disturbance of the territory will be obtained with the creation of a series of informational-assessment and recommendation maps, and actions for the stabilization of natural resource potential will be developed.</p> <p>Evaluations of the socio-economic development of the region, socio-demographic, labor potential, economic potential of the territory, social infrastructure, tourist, natural-recreational potential, cultural-historical resources will be obtained, criteria for sustainable development of the region will be developed, suggestions for state and regional policy on sustainable development, and a forecast of socio-economic development of the region will be provided.</p> <p>Scientific-applied foundations for ensuring the sustainability of natural-economic systems and socio-economic development in the context of sustainable development and green growth will be developed, including the concept of sustainable development, assessment of the current state of natural-economic systems and socio-economic development, and a comprehensive set of measures to ensure the sustainable development of the Western Kazakhstan Region (WKR).</p>
<p>Research team members with their identifiers (Scopus</p>	<p>As indicated in the table below ↓</p>

Author ID, Researcher ID, ORCID, if available) and links to relevant profiles	
List of publications with links to them	
Patents	Certificate of entry of information into the state register of rights to objects protected by copyright (scientific work) / No. 40880 dated November 30, 2023, “Models of Regional Tourism Development in the Western Kazakhstan Region” / Aktymbayeva A.S., Artemyev A.M., Nuruly Y., Sapiyeva A.Z., Bayburiev R.M., Beisakhmet A.A., Mominov S.A., Kaliyeva A.B.

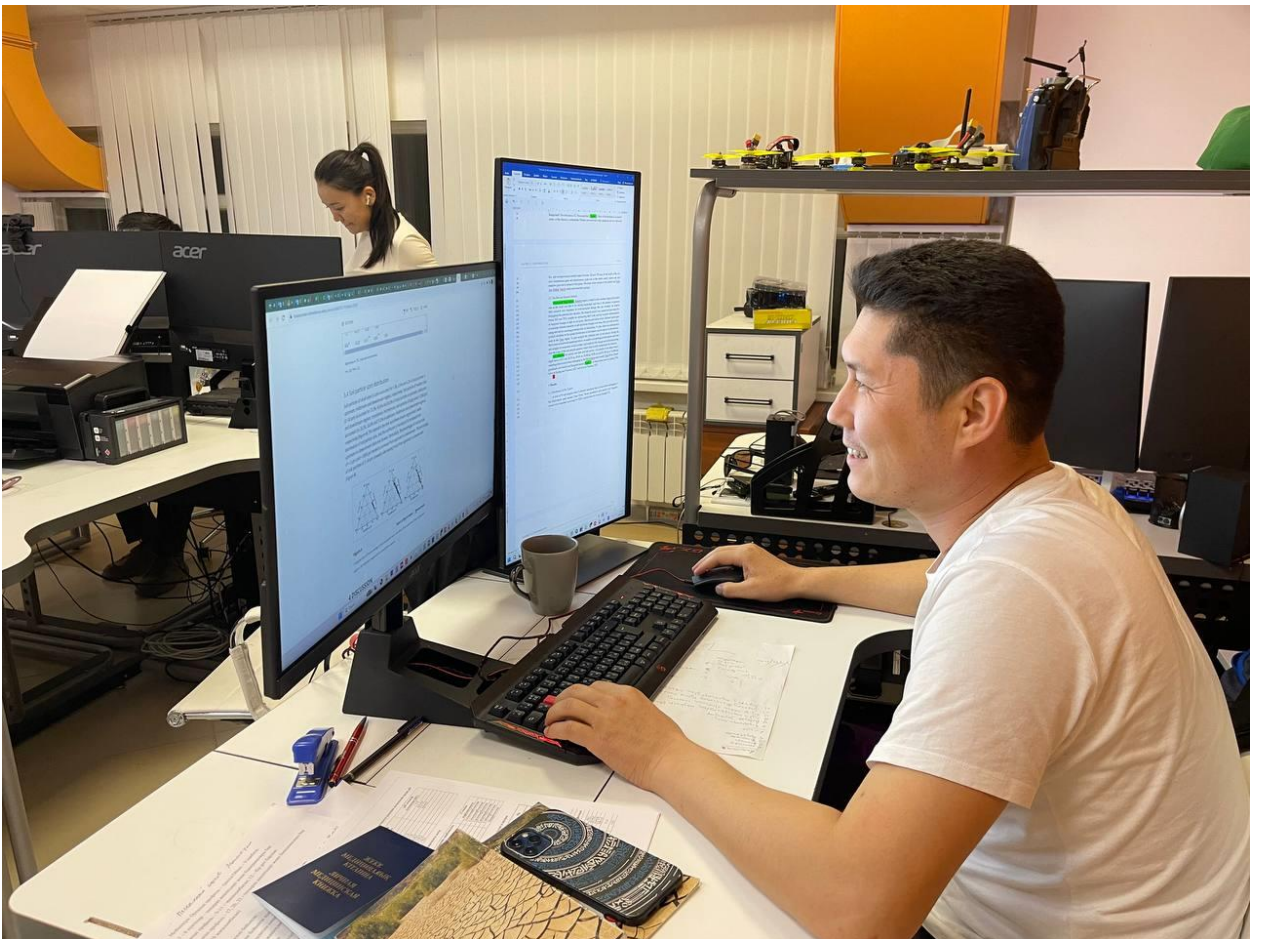


**ЖАСЫЛ ДАМУ КОНТЕКСТІНДЕ БАТЫС ҚАЗАҚСТАН Өңірінің Табиғи-шаруашылық және Әлеуметтік Экономикалық жүйелерінің тұрақты дамуы: кешенді талдау, тұжырымдама, болжамдық бағалау және сценарийлер**

**Устойчивое развитие природно-хозяйственных и социально-экономических систем Западно-казахстанского региона в контексте зеленого роста: комплексный анализ, концепция, прогнозные оценки и сценарии**

**SUSTAINABLE DEVELOPMENT OF NATURAL-INDUSTRIAL AND SOCIO-ECONOMIC SYSTEMS OF THE WEST KAZAKHSTAN REGION IN THE CONTEXT OF GREEN GROWTH: A COMPREHENSIVE ANALYSIS, CONCEPT, FORECAST ESTIMATES AND SCENARIOS**



















### List of performers of the Program

№	Full name	Scopus Author ID, Researcher ID, ORCID	Link to profile
1.	Askarova Maulken Akishovna	Scopus h-index=2 Scopus ID: 57210194023  Web of Science h-index=4 ResearcherID: IIV-3406-2023  ORCID iD: 0000-0001-5958-3827	<a href="https://www.scopus.com/authid/detail.uri?authorId=57210194023">https://www.scopus.com/authid/detail.uri?authorId=57210194023</a>  <a href="https://www.webofscience.com/wos/author/record/18863932.43753323">https://www.webofscience.com/wos/author/record/18863932.43753323</a>  <a href="https://orcid.org/0000-0001-5958-3827">https://orcid.org/0000-0001-5958-3827</a>
2.	Aktymbayeva Aliya Sagyndykovna	Scopus h-index=5 Scopus ID: 55916649100  Web of Science h-index=1 ResearcherID: N-9777-2014  ORCID iD: 0000-0003-1269-4356  Google Scholar h-index=8	<a href="https://www.scopus.com/authid/detail.uri?authorId=55916649100&amp;eid=2-s2.0-85078365741">https://www.scopus.com/authid/detail.uri?authorId=55916649100&amp;eid=2-s2.0-85078365741</a>  <a href="https://app.webofknowledge.com/author/#/record/21139704?SID=C4B5huBaCrXWmwDFItd">https://app.webofknowledge.com/author/#/record/21139704?SID=C4B5huBaCrXWmwDFItd</a>  <a href="https://orcid.org/0000-0003-1269-4356">https://orcid.org/0000-0003-1269-4356</a>  <a href="https://scholar.google.com/citations?user=Yq4zufeAAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=Yq4zufeAAAAJ&amp;hl=ru</a>

3.	Bazarbayeva Tursynkul Amankeldiyevna	Scopus <i>h</i> -index=4 Scopus Author ID – 56784399000  Web of Science <i>h</i> -index=2 Researcher ID- CEH-3380-2022  ORCID ID: 0000-0001-8775- 1234	<a href="https://www.scopus.com/authid/detail.uri?authorId=56784399000">https://www.scopus.com/authid/detail.uri?authorId=56784399000</a>  <a href="https://www.webofscience.com/wos/woscc/summary/cc1fd2ef-2bf6-497c-ba2e-5f244b64774d-61aa8f12/relevance/1">https://www.webofscience.com/wos/woscc/summary/cc1fd2ef-2bf6-497c-ba2e-5f244b64774d-61aa8f12/relevance/1</a>  <a href="https://orcid.org/0000-0001-8775-1234">https://orcid.org/0000-0001-8775-1234</a>
4.	Mukanova Gulzhanat Amangeldikyzy	Scopus Author ID – 55067113400 Scopus <i>h</i> -index=3  Web of Science <i>h</i> -index=1 Researcher ID: A-9814-2015  ORCID ID: 0000-0002-3683- 6622  Google Scholar <i>h</i> -index=3	<a href="https://www.scopus.com/authid/detail.uri?authorId=55067113400">https://www.scopus.com/authid/detail.uri?authorId=55067113400</a>  <a href="https://www.webofscience.com/wos/author/record/4078602_12017178">https://www.webofscience.com/wos/author/record/4078602_12017178</a>  <a href="https://orcid.org/0000-0002-3683-6622">https://orcid.org/0000-0002-3683-6622</a>  <a href="https://scholar.google.com/citations?hl=ru&amp;user=7oZ6YboAAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=7oZ6YboAAAAJ</a>
5.	Shimshikov Batyrgeldy Yerdenovich	Scopus Author ID – 55144159100 Scopus <i>h</i> -index=1  Web of Science <i>h</i> -index=1 Researcher ID GCE-4107-2022  ORCID ID: 0000-0002-0196- 3373	<a href="https://www.scopus.com/authid/detail.uri?authorId=55144159100">https://www.scopus.com/authid/detail.uri?authorId=55144159100</a>  <a href="https://www.webofscience.com/wos/author/record/29474491">https://www.webofscience.com/wos/author/record/29474491</a> ORCID ID: <a href="https://orcid.org/0000-0002-0196-3373">https://orcid.org/0000-0002-0196-3373</a>
6.	Kakimzhanov Yerkin Khamitovich	Scopus Author ID 56946816100 Scopus <i>h</i> -index=2  Web of Science Researcher ID: FCT-2719-2022 <i>h</i> -index= 1  Google Scholar <i>h</i> -index=2  ORCID ID: 0000-0002-1919- 6459	<a href="https://www.scopus.com/authid/detail.uri?authorId=56946816100">https://www.scopus.com/authid/detail.uri?authorId=56946816100</a>  <a href="https://www.webofscience.com/wos/author/record/23413113">https://www.webofscience.com/wos/author/record/23413113</a>  <a href="https://scholar.google.com/citations?user=g-inKF0AAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=g-inKF0AAAAJ&amp;hl=ru</a>  <a href="https://orcid.org/0000-0002-1919-6459">https://orcid.org/0000-0002-1919-6459</a>
7.	Oshaqbay Aitu Aydaruly	ORCID ID: 0000-0003-2515- 923X	<a href="https://orcid.org/0000-0003-2515-923X">https://orcid.org/0000-0003-2515-923X</a>
8.	Zholdasbek Aknur Yerlankyzy	Scopus <i>h</i> -index= 0 Scopus Author ID – 57221328393  Web of Science <i>h</i> -index=0 Researcher ID- JNA-3125-2023  ORCID ID: 0000-0003-1280- 0120	<a href="https://www.scopus.com/authid/detail.uri?authorId=57221328393">https://www.scopus.com/authid/detail.uri?authorId=57221328393</a>  <a href="https://www.webofscience.com/wos/author/record/51346078">https://www.webofscience.com/wos/author/record/51346078</a>  <a href="https://scholar.google.com/citations?user=hR_F0dEAAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=hR_F0dEAAAAJ&amp;hl=ru</a>  <a href="https://orcid.org/0000-0003-1280-0120">https://orcid.org/0000-0003-1280-0120</a>
9.	Khasenova Alisa Nurlanovna	ORCID ID: 0000-0001-6482- 6133	<a href="https://orcid.org/0000-0001-6482-6133">https://orcid.org/0000-0001-6482-6133</a>
10.	Alimuratkyzy Aitolkyn	ORCID ID: 0000-0001-6938- 3511	<a href="https://orcid.org/0000-0001-6938-3511">https://orcid.org/0000-0001-6938-3511</a>
11.	Tukenova Zulfiya Aidunovna	Scopus <i>h</i> -index=2 Scopus Author ID: 56951094300  Web of Science ResearcherID: AFF-6959-2022  ORCID ID: 0000-0002-9919- 6220	<a href="http://www.scopus.com/inward/authorDetails.url?authorID=56951094300&amp;partnerID=MN8TOARS">http://www.scopus.com/inward/authorDetails.url?authorID=56951094300&amp;partnerID=MN8TOARS</a>  <a href="https://www.webofscience.com/wos/author/record/AFF-6959-2022">https://www.webofscience.com/wos/author/record/AFF-6959-2022</a>  <a href="https://orcid.org/0000-0002-9919-6220">https://orcid.org/0000-0002-9919-6220</a>



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12.	Mukhambetov Bolat	Scopus <i>h</i> -index=2 Scopus ID: 57205439080  Web of Science ResearcherID: ADQ-9714-2022  ORCID ID: 0000-0001-6693-7742  Google Scholar <i>h</i> -index=4	<a href="https://www.scopus.com/authid/detail.uri?authorId=57205439080">https://www.scopus.com/authid/detail.uri?authorId=57205439080</a>  <a href="https://www.webofscience.com/wos/author/record/25712097">https://www.webofscience.com/wos/author/record/25712097</a>  <a href="https://orcid.org/0000-0001-6693-7742">https://orcid.org/0000-0001-6693-7742</a>  <a href="https://scholar.google.ru/citations?user=HZCVW0wAAAAAJ&amp;hl=ru">https://scholar.google.ru/citations?user=HZCVW0wAAAAAJ&amp;hl=ru</a>
13.	Kyrgyzbay Kudaybergen Talgatuly	Scopus <i>h</i> -index=1 Scopus ID: 58690631600  Web of Science <i>h</i> -index=1 ResearcherID: AEX-8604-2022  ORCID ID: 0000-0002-4279-6436	<a href="https://www.scopus.com/authid/detail.uri?authorId=58690631600">https://www.scopus.com/authid/detail.uri?authorId=58690631600</a>  <a href="https://www.webofscience.com/wos/author/record/AEX-8604-2022">https://www.webofscience.com/wos/author/record/AEX-8604-2022</a>  <a href="https://orcid.org/0000-0002-4279-6436">https://orcid.org/0000-0002-4279-6436</a>
14.	Zhumatayev Serik Muratovich	Web of Science <i>h</i> -index=0 ResearcherID: JZU-1104-2024  ORCID ID: 0009-0008-1618-7881	<a href="https://www.webofscience.com/wos/author/record/JZU-1104-2024">https://www.webofscience.com/wos/author/record/JZU-1104-2024</a>  <a href="https://orcid.org/my-orcid?orcid=0009-0008-1618-7881">https://orcid.org/my-orcid?orcid=0009-0008-1618-7881</a>
15.	Mustafayev Mustafa Qilman oglu (Azerbaijan, Baku)	Scopus <i>h</i> -index= 2 Scopus ID: 55985078200  ORCID ID: 0000-0003-2071-3078  Google Scholar <i>h</i> -index=9	<a href="https://www.scopus.com/authid/detail.uri?authorId=55985078200">https://www.scopus.com/authid/detail.uri?authorId=55985078200</a>  <a href="https://orcid.org/0000-0003-2071-3078">https://orcid.org/0000-0003-2071-3078</a>  <a href="https://scholar.google.com/citations?user=Kh2fqCwAAAAAJ&amp;hl=ru&amp;oi=ao">https://scholar.google.com/citations?user=Kh2fqCwAAAAAJ&amp;hl=ru&amp;oi=ao</a>
16.	Nyussupova Gulnara Nurmukhamedovna	Scopus <i>h</i> -index= 5 Scopus Author ID 54382275400  Web of Science <i>h</i> -index=3 Web of Science ResearcherID: O-2263-2014  ORCID 0000-001-5294-2671	<a href="https://www.scopus.com/authid/detail.uri?authorId=54382275400">https://www.scopus.com/authid/detail.uri?authorId=54382275400</a>  <a href="https://www.webofscience.com/wos/author/record/241640">https://www.webofscience.com/wos/author/record/241640</a>  <a href="https://orcid.org/0000-0001-5294-2671">https://orcid.org/0000-0001-5294-2671</a>
17.	Kelinbayeva Roza Zharmukhametovna	Scopus <i>h</i> -index= 2 Scopus Author ID 57195229747  ORCID 0000-0001-6922-1205	<a href="https://www.scopus.com/authid/detail.uri?authorId=57195229747">https://www.scopus.com/authid/detail.uri?authorId=57195229747</a>  <a href="https://orcid.org/0000-0001-6922-1205">https://orcid.org/0000-0001-6922-1205</a>
18.	Kenespayeva Laura Bayyrbekkyzy	Scopus <i>h</i> -index=1 Scopus Author ID 57205169343  ResearcherID GNR-7697-2022  ORCID 000-0001-5734-1947	<a href="https://www.scopus.com/authid/detail.uri?authorId=57226005086">https://www.scopus.com/authid/detail.uri?authorId=57226005086</a>  <a href="https://www.webofscience.com/wos/author/record/32317931">https://www.webofscience.com/wos/author/record/32317931</a>  <a href="https://orcid.org/0000-0001-5734-1947">https://orcid.org/0000-0001-5734-1947</a>
19.	Aubakirova Gaukhar Bolatovna	Scopus <i>h</i> -index= 1 Scopus Author ID 57205169179  ORCID 0000-0002-5806-5638	<a href="https://www.scopus.com/authid/detail.uri?authorId=57205169179">https://www.scopus.com/authid/detail.uri?authorId=57205169179</a>  <a href="https://orcid.org/0000-0002-5806-5638">https://orcid.org/0000-0002-5806-5638</a>
20.	Aidarkhanova Gaukhar Berikovna	Scopus <i>h</i> -index=1 Scopus ID: 57494687500	<a href="https://www.scopus.com/authid/detail.uri?authorId=57494687500">https://www.scopus.com/authid/detail.uri?authorId=57494687500</a>

		Web of Science <i>h</i> -index=1 Researcher ID: AAY-9178-2021  ORCID ID 0000-0001-7280-7071	<a href="https://www.webofscience.com/wos/author/record/2375191">https://www.webofscience.com/wos/author/record/2375191</a>  <a href="https://orcid.org/0000-0001-7280-7071">https://orcid.org/0000-0001-7280-7071</a>
21.	Zhakypbek Abzal Maulenovich	ORCID 0000-0003-2538-1287	<a href="https://orcid.org/0000-0003-2538-1287">https://orcid.org/0000-0003-2538-1287</a>
22.	Tazhiyeva Damira Abdigafarovna	Scopus <i>h</i> -index= 1 Scopus Author ID 5720516992  ResearcherID CCA-4675-2022  ORCID 0000-0001-6824-5600	<a href="https://www.scopus.com/authid/detail.uri?authorId=5720516992">https://www.scopus.com/authid/detail.uri?authorId=5720516992</a>  <a href="https://orcid.org/0000-0001-6824-5600">https://orcid.org/0000-0001-6824-5600</a>
23.	Uvarov Vladimir Nikolaevich	ResearcherID: GZM-9819-2022	<a href="https://www.webofscience.com/wos/author/record/35210037">https://www.webofscience.com/wos/author/record/35210037</a>
24.	Mikhnenko Vladlen	Scopus <i>h</i> -index=13 Scopus Author ID 16302098300  Web of Science <i>h</i> -index=13 Web of Science ResearcherID: GXH-1286-2022  ORCID 0000-0001-8944-0608	<a href="https://www.scopus.com/authid/detail.uri?authorId=16302098300">https://www.scopus.com/authid/detail.uri?authorId=16302098300</a>  <a href="https://www.webofscience.com/wos/author/record/34651495">https://www.webofscience.com/wos/author/record/34651495</a>  <a href="https://orcid.org/0000-0001-8944-0608">https://orcid.org/0000-0001-8944-0608</a>
25.	Kozhakhmetov Bazaraly Toktarovich	Scopus Author ID 57226006934	<a href="https://www.scopus.com/authid/detail.uri?authorId=57226006934">https://www.scopus.com/authid/detail.uri?authorId=57226006934</a>
26.	Pavlichenko Lyudmila Mikhailovna	Scopus <i>h</i> -index=1 Scopus ID: 55367910300  ORCID iD: 0000-0002-2650-806X	<a href="https://www.scopus.com/authid/detail.uri?authorId=55367910300">https://www.scopus.com/authid/detail.uri?authorId=55367910300</a>  <a href="https://orcid.org/0000-0002-2650-806X">https://orcid.org/0000-0002-2650-806X</a>
27.	Rysmagambetova Aina Akanovna	Scopus <i>h</i> -index=2 Scopus ID: 56955797100  Web of Science <i>h</i> -index=1 ResearcherID: GWQ-9602-2022  Google Scholar <i>h</i> -index=3  ORCID iD: 0000-0003-0791-3075	<a href="https://www.scopus.com/authid/detail.uri?authorId=56955797100">https://www.scopus.com/authid/detail.uri?authorId=56955797100</a>  <a href="https://www.webofscience.com/wos/author/record/GWQ-9602-2022">https://www.webofscience.com/wos/author/record/GWQ-9602-2022</a>  <a href="https://scholar.google.ru/citations?hl=ru&amp;pli=1&amp;user=ap_Ow1gAAAAJ">https://scholar.google.ru/citations?hl=ru&amp;pli=1&amp;user=ap_Ow1gAAAAJ</a>  <a href="https://orcid.org/0000-0003-0791-3075">https://orcid.org/0000-0003-0791-3075</a>
28.	Zhanabayeva Zhanara Anuarbekkyzy	Scopus <i>h</i> -index=2 Scopus ID: 57191187902  Web of Science <i>h</i> -index=2 ResearcherID: ABE-5670-2021  Google Scholar <i>h</i> -index=3  ORCID iD: 0000-0002-4226-1941	<a href="https://www.scopus.com/authid/detail.uri?authorId=57191187902">https://www.scopus.com/authid/detail.uri?authorId=57191187902</a>  <a href="https://www.webofscience.com/wos/author/record/2425724">https://www.webofscience.com/wos/author/record/2425724</a>  <a href="https://scholar.google.ru/citations?user=pOKLuHoAAAAJ&amp;hl=ru&amp;oi=sra">https://scholar.google.ru/citations?user=pOKLuHoAAAAJ&amp;hl=ru&amp;oi=sra</a>  <a href="https://orcid.org/0000-0002-4226-1941">https://orcid.org/0000-0002-4226-1941</a>
29.	Bayburiyev Ruslan Muratovich	Scopus <i>h</i> -index=3 Scopus ID: 57192215727  Web of Science <i>h</i> -index=2 ResearcherID: AAR-4839-2020  Google Scholar <i>h</i> -index=6  ORCID iD: 0000-0001-8752-9190	<a href="https://www.scopus.com/authid/detail.uri?authorId=57192215727">https://www.scopus.com/authid/detail.uri?authorId=57192215727</a>  <a href="https://www.webofscience.com/wos/author/record/2504073,29041473">https://www.webofscience.com/wos/author/record/2504073,29041473</a>  <a href="https://scholar.google.com/citations?user=7P7cPSMAAAAJ&amp;hl=en">https://scholar.google.com/citations?user=7P7cPSMAAAAJ&amp;hl=en</a>  <a href="https://orcid.org/my-orcid?orcid=0000-0001-8752-9190">https://orcid.org/my-orcid?orcid=0000-0001-8752-9190</a>



30.	Mominov Serik Abdukarimovich	Scopus <i>h</i> -index=1 Scopus ID: 57559902000  ORCID iD 0000-0001-8686-9249	<a href="https://www.scopus.com/authid/detail.uri?authorId=57559902000">https://www.scopus.com/authid/detail.uri?authorId=57559902000</a>  <a href="https://orcid.org/my-orcid?orcid=0000-0001-8686-9249">https://orcid.org/my-orcid?orcid=0000-0001-8686-9249</a>
31.	Artemyev Alexander Mikhailovich	Scopus Author ID: 57226032630 <i>h</i> -index=2  Researcher ID Web of Science: N-9833-2014  Google Scholar <i>h</i> -index=3  ORCID: 0000-0002-5325-7155	<a href="https://www.scopus.com/authid/detail.uri?authorId=57226032630">https://www.scopus.com/authid/detail.uri?authorId=57226032630</a>  <a href="https://scholar.google.com/citations?hl=ru&amp;user=WdQTgXkAAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=WdQTgXkAAAAJ</a>  <a href="https://orcid.org/0000-0002-5325-7155">https://orcid.org/0000-0002-5325-7155</a>
32.	Salnikov Vitaly Grigoriyevich	Scopus <i>h</i> -index=6 Scopus ID: 6602504406  Web of Science <i>h</i> -index=1 ResearcherID:C-3228-2013  Google Scholar <i>h</i> -index=5  ORCID iD: 0000-0003-3392-4587	<a href="https://www.scopus.com/authid/detail.uri?authorId=6602504406">https://www.scopus.com/authid/detail.uri?authorId=6602504406</a>  <a href="https://www.webofscience.com/wos/author/record/C-3228-2013">https://www.webofscience.com/wos/author/record/C-3228-2013</a>  <a href="https://scholar.google.com/citations?user=YhSm8SQAAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=YhSm8SQAAAAJ&amp;hl=ru</a>  <a href="https://orcid.org/0000-0003-3392-4587">https://orcid.org/0000-0003-3392-4587</a>
33.	Polyakova Svetlana Yevgenievna	Scopus <i>h</i> -index=5 Scopus ID: 56400797600  Web of Science <i>h</i> -index=0 ResearcherID:AEL-6886-2022  Google Scholar <i>h</i> -index=6  ORCID iD: 0000-0003-2289-2823	<a href="https://www.scopus.com/authid/detail.uri?authorId=56400797600">https://www.scopus.com/authid/detail.uri?authorId=56400797600</a>  <a href="https://www.webofscience.com/wos/author/record/AEL-6886-2022">https://www.webofscience.com/wos/author/record/AEL-6886-2022</a>  <a href="https://scholar.google.com/citations?user=gqJ7Nb0AAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=gqJ7Nb0AAAAJ&amp;hl=ru</a>  <a href="https://orcid.org/0000-0003-2289-2823">https://orcid.org/0000-0003-2289-2823</a>
34.	Ulman Alexander Abramovich		
35.	Tazhibayeva Tamara Lashkarovna	Scopus <i>h</i> -index=5 Scopus ID: 57196237254  Web of Science <i>h</i> -index=0 ResearcherID: B-1206-2015  Google Scholar <i>h</i> -index=3  ORCID iD: 0000-0001-8813-1440	<a href="https://www.scopus.com/authid/detail.uri?authorId=57196237254">https://www.scopus.com/authid/detail.uri?authorId=57196237254</a>  <a href="https://www.webofscience.com/wos/author/record/B-1206-2015">https://www.webofscience.com/wos/author/record/B-1206-2015</a>  <a href="https://scholar.google.com/citations?user=1YfnLLoAAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=1YfnLLoAAAAJ&amp;hl=ru</a>  <a href="https://orcid.org/0000-0001-8813-1440">https://orcid.org/0000-0001-8813-1440</a>
36.	Talanov Yevgeniy Alexandrovich	Scopus <i>h</i> -index=1 Scopus ID: 57196262219  Google Scholar <i>h</i> -index=5  ORCID iD: 0000-0001-5964-8598	<a href="https://www.scopus.com/authid/detail.uri?authorId=57196262219">https://www.scopus.com/authid/detail.uri?authorId=57196262219</a>  <a href="https://scholar.google.com/citations?user=Ex1M_7oAAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=Ex1M_7oAAAAJ&amp;hl=ru</a>  <a href="https://orcid.org/0000-0001-5964-8598">https://orcid.org/0000-0001-5964-8598</a>
37.	Kauazov Azamat Maratovich	Scopus <i>h</i> -index=3 Scopus ID: 56422412200	<a href="https://www.scopus.com/authid/detail.uri?authorId=56422412200">https://www.scopus.com/authid/detail.uri?authorId=56422412200</a>
38.	Mansurova Madina Yesimkhanovna	Scopus <i>h</i> -index=5 Scopus ID: 56617164900  Web of Science <i>h</i> -index=3 ResearcherID: O-4501-2014  Google Scholar <i>h</i> -index=7	<a href="https://www.scopus.com/authid/detail.uri?authorId=56617164900">https://www.scopus.com/authid/detail.uri?authorId=56617164900</a>  <a href="https://www.webofscience.com/wos/author/record/O-4501-2014">https://www.webofscience.com/wos/author/record/O-4501-2014</a>

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39.	Tursumbayeva Madina Orazgazyevna	Scopus <i>h</i> -index=4 Scopus ID: 57197808769  Web of Science <i>h</i> -index=4 ResearcherID: T-1763-2017  Google Scholar <i>h</i> -index=4  ORCID iD: 0000-0002-7526-8197	<a href="https://www.scopus.com/authid/detail.uri?authorId=57197808769">https://www.scopus.com/authid/detail.uri?authorId=57197808769</a>  <a href="https://www.webofscience.com/wos/author/record/T-1763-2017">https://www.webofscience.com/wos/author/record/T-1763-2017</a>  <a href="https://scholar.google.com/citations?user=EbFliVYAAAAAJ&amp;hl=en">https://scholar.google.com/citations?user=EbFliVYAAAAAJ&amp;hl=en</a>  <a href="https://orcid.org/0000-0002-7526-8197">https://orcid.org/0000-0002-7526-8197</a>
40.	Raimbekova Zhanar Tuimebaykyzy	Scopus <i>h</i> -index=1 Scopus ID: 572119196407  Web of Science <i>h</i> -index=1 ResearcherID: JFA-1902-2023  Google Scholar <i>h</i> -index=1  ORCID iD: 0000-0003-4377-0948	<a href="https://www.scopus.com/authid/detail.uri?authorId=572119196407">https://www.scopus.com/authid/detail.uri?authorId=572119196407</a>  <a href="https://www.webofscience.com/wos/author/record/49297354">https://www.webofscience.com/wos/author/record/49297354</a>  <a href="https://scholar.google.com/citations?hl=ru&amp;user=Oj-P6DAAAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=Oj-P6DAAAAAJ</a>  <a href="https://orcid.org/0000-0003-4377-0948">https://orcid.org/0000-0003-4377-0948</a>
41.	Ospan Asel Galymzhankyzy	Scopus <i>h</i> -index=1 Scopus ID: 57238489800  ORCID iD: 0000-0002-1860-6997	<a href="https://www.scopus.com/authid/detail.uri?authorId=57238489800">https://www.scopus.com/authid/detail.uri?authorId=57238489800</a>  <a href="https://orcid.org/0000-0002-1860-6997">https://orcid.org/0000-0002-1860-6997</a>
42.	Kisebayev Daulet Kurmangazyevich	Scopus <i>h</i> -index=1 Scopus ID: 58115856400	<a href="https://www.scopus.com/authid/detail.uri?authorId=58115856400">https://www.scopus.com/authid/detail.uri?authorId=58115856400</a>
43.	Nassyrova Manzura Sadykzhanovna		
44.	Musralinova Gulnur Turarbekovna	Scopus <i>h</i> -index=1 Scopus ID:58115092000  Google Scholar <i>h</i> -index=1  ORCID ID 0000 0002 6628 9527	<a href="https://www.scopus.com/authid/detail.uri?authorId=58115092000">https://www.scopus.com/authid/detail.uri?authorId=58115092000</a>  <a href="https://scholar.google.com/citations?user=EGqMBA4AAAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=EGqMBA4AAAAAJ&amp;hl=ru</a>  <a href="https://orcid.org/0000-0002-6628-9527">https://orcid.org/0000-0002-6628-9527</a>
45.	Zhienbayev Meiran Muratuly	ORCID ID 0009-0005-0497-0965	<a href="https://orcid.org/0009-0005-0497-0965">https://orcid.org/0009-0005-0497-0965</a>
46.	Giancarlo Ciarelli	Scopus <i>h</i> -index=17 Scopus ID: 56398509100  ORCID iD: 0000-0003-0483-6449	<a href="https://www.scopus.com/authid/detail.uri?authorId=56398509100">https://www.scopus.com/authid/detail.uri?authorId=56398509100</a>  <a href="https://orcid.org/0000-0003-0483-6449">https://orcid.org/0000-0003-0483-6449</a>
47.	Inelova Zarina Arkenzhanovna	Scopus <i>h</i> -index=5 Scopus ID: 57196243758  Web of Science <i>h</i> -index=4 ResearcherID: AAT-5204-2021  Google Scholar <i>h</i> -index=6  ORCID iD: 0000-0001-8778-5848	<a href="https://www.scopus.com/authid/detail.uri?authorId=57196243758">https://www.scopus.com/authid/detail.uri?authorId=57196243758</a>  <a href="https://www.webofscience.com/wos/author/record/28696,1305932,2330006">https://www.webofscience.com/wos/author/record/28696,1305932,2330006</a>  <a href="https://scholar.google.com/citations?hl=ru&amp;user=m_Re5wUAAAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=m_Re5wUAAAAAJ</a>  <a href="https://orcid.org/0000-0001-8778-5848">https://orcid.org/0000-0001-8778-5848</a>
48.	Kurmanbayeva Meruert Sakenovna	Scopus <i>h</i> -index=8 Scopus ID: 56029519900  Web of Science <i>h</i> -index=6 ResearcherID: O-1562-2016	<a href="https://www.scopus.com/authid/detail.uri?authorId=56029519900">https://www.scopus.com/authid/detail.uri?authorId=56029519900</a>



		<p>Google Scholar <i>h</i>-index=9</p> <p>ORCID iD: 0000-0002-5050-9142</p>	<p><a href="https://www.webofscience.com/wos/author/reco rd/535175,2514918,46973343,47139928,48565722">https://www.webofscience.com/wos/author/reco rd/535175,2514918,46973343,47139928,48565722</a></p> <p><a href="https://scholar.google.com/citations?hl=ru&amp;user=voVkeOUAAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=voVkeOUAAAAJ</a></p> <p><a href="https://orcid.org/0000-0002-5050-9142">https://orcid.org/0000-0002-5050-9142</a></p>
49.	Akhmetova Aigul Bazylbekovna	<p>Scopus <i>h</i>-index=6 Scopus ID: 55938680900</p> <p>Web of Science <i>h</i>-index=1 ResearcherID: B-3631-2012</p> <p>Google Scholar <i>h</i>-index=8</p> <p>ORCID iD: 0000-0001-6120-6836</p>	<p><a href="https://www.scopus.com/authid/detail.uri?authorId=55938680900">https://www.scopus.com/authid/detail.uri?authorId=55938680900</a></p> <p><a href="https://www.webofscience.com/wos/author/reco rd/187637,18758698">https://www.webofscience.com/wos/author/reco rd/187637,18758698</a></p> <p><a href="https://scholar.google.com/citations?hl=ru&amp;user=3_GwoKEAAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=3_GwoKEAAAAJ</a></p> <p><a href="https://orcid.org/0000-0001-6120-6836">https://orcid.org/0000-0001-6120-6836</a></p>
50.	Shakiyeva Tatyana Vladimirovna	<p>Scopus <i>h</i>-index=4 Scopus ID: 55911739700</p> <p>Web of Science <i>h</i>-index=1 ResearcherID: GYZ-7679-2022</p> <p>ORCID iD: 0000-0002-9664-442X</p>	<p><a href="https://www.scopus.com/authid/detail.uri?authorId=55911739700">https://www.scopus.com/authid/detail.uri?authorId=55911739700</a></p> <p><a href="https://www.webofscience.com/wos/author/reco rd/16086649,35077897,43305277">https://www.webofscience.com/wos/author/reco rd/16086649,35077897,43305277</a></p> <p><a href="https://orcid.org/0000-0002-9664-442X">https://orcid.org/0000-0002-9664-442X</a></p>
51.	Beisembinova Ardak Serikovna	<p>Scopus <i>h</i>-index=2 Scopus ID: 57218568485</p> <p>Web of Science <i>h</i>-index=0 ResearcherID: ELN-5127-2022</p> <p>ORCID iD: 0000-0002-6057-7309</p>	<p><a href="https://www.scopus.com/authid/detail.uri?authorId=57218568485">https://www.scopus.com/authid/detail.uri?authorId=57218568485</a></p> <p><a href="https://www.webofscience.com/wos/author/reco rd/19225521">https://www.webofscience.com/wos/author/reco rd/19225521</a></p> <p><a href="https://orcid.org/0000-0002-6057-7309">https://orcid.org/0000-0002-6057-7309</a></p>
52.	Moldagaliyeva Aitolkyn Yessenkulovna	<p>Scopus <i>h</i>-index=2 Scopus ID: 57218566864</p> <p>Web of Science <i>h</i>-index=0 ResearcherID: AEA-4235-2022</p> <p>ORCID iD: 0000-0002-8060-4933</p>	<p><a href="https://www.scopus.com/authid/detail.uri?authorId=57218566864">https://www.scopus.com/authid/detail.uri?authorId=57218566864</a></p> <p><a href="https://www.webofscience.com/wos/author/reco rd/3341135,11745095">https://www.webofscience.com/wos/author/reco rd/3341135,11745095</a></p> <p><a href="https://orcid.org/0000-0002-8060-4933">https://orcid.org/0000-0002-8060-4933</a></p>
53.	Koshkimbayeva Umit Toleukyzy	<p>Scopus <i>h</i>-index=2 Scopus ID: 57222086227</p> <p>Web of Science <i>h</i>-index=1 ResearcherID: JMD-1256-2023</p> <p>Google Scholar <i>h</i>-index=3</p> <p>ORCID iD: 0000-0001-9726-646X</p>	<p><a href="https://www.scopus.com/authid/detail.uri?authorId=57222086227">https://www.scopus.com/authid/detail.uri?authorId=57222086227</a></p> <p><a href="https://www.webofscience.com/wos/author/reco rd/10242845,51115922">https://www.webofscience.com/wos/author/reco rd/10242845,51115922</a></p> <p><a href="https://scholar.google.com/citations?hl=ru&amp;user=qMYzVX0AAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=qMYzVX0AAAAJ</a></p> <p><a href="https://orcid.org/0000-0001-9726-646X">https://orcid.org/0000-0001-9726-646X</a></p>
54.	Assipova Zhanna Medeuovna	<p>Scopus <i>h</i>-index=5 Scopus ID: 56124528100</p> <p>Web of Science <i>h</i>-index=2 ResearcherID: ABF-8258-2021</p> <p>Google Scholar <i>h</i>-index=6</p> <p>ORCID iD: 0000-0003-1260-4867</p>	<p><a href="https://www.scopus.com/authid/detail.uri?authorId=56124528100">https://www.scopus.com/authid/detail.uri?authorId=56124528100</a></p> <p><a href="https://www.webofscience.com/wos/author/reco rd/2436527">https://www.webofscience.com/wos/author/reco rd/2436527</a></p> <p><a href="https://scholar.google.com/citations?user=wAsVdJgAAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=wAsVdJgAAAAJ&amp;hl=ru</a></p> <p><a href="https://orcid.org/0000-0003-1260-4867">https://orcid.org/0000-0003-1260-4867</a></p>

55.	Kulakhmetova Gulbaram Amantayevna	Scopus <i>h</i> -index=4 Scopus ID: 57194222354  Web of Science <i>h</i> -index=0 ResearcherID: AAN-3832-2020  Google Scholar <i>h</i> -index=6  ORCID iD: 0000-0002-0318-3514	<a href="https://www.scopus.com/authid/detail.uri?authorId=57194222354">https://www.scopus.com/authid/detail.uri?authorId=57194222354</a>  <a href="https://www.webofscience.com/wos/author/record/2434930">https://www.webofscience.com/wos/author/record/2434930</a>  <a href="https://scholar.google.com/citations?user=e8FvpWoAAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=e8FvpWoAAAAJ&amp;hl=ru</a>  <a href="https://orcid.org/0000-0002-0318-3514">https://orcid.org/0000-0002-0318-3514</a>
56.	Imanbekova Bagdagul Tolendiyevna	Scopus <i>h</i> -index=3 Scopus ID: 56667664500  Google Scholar <i>h</i> -index=2  ORCID iD: 0000-0003-1897-907X	<a href="https://www.scopus.com/authid/detail.uri?authorId=56667664500">https://www.scopus.com/authid/detail.uri?authorId=56667664500</a>  <a href="https://scholar.google.com/citations?hl=ru&amp;user=E4sZYnIAAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=E4sZYnIAAAAJ</a>  <a href="https://orcid.org/0000-0003-1897-907X">https://orcid.org/0000-0003-1897-907X</a>
57.	Shokparova Dana Kanatkhanovna	Scopus <i>h</i> -index=3 Scopus ID: 55961222900  Web of Science <i>h</i> -index=2 ResearcherID: B-1656-2015  Google Scholar <i>h</i> -index=4  ORCID iD: 0000-0002-5400-2234	<a href="https://www.scopus.com/authid/detail.uri?authorId=55961222900">https://www.scopus.com/authid/detail.uri?authorId=55961222900</a>  <a href="https://www.webofscience.com/wos/author/record/561550,38581709">https://www.webofscience.com/wos/author/record/561550,38581709</a>  <a href="https://scholar.google.com/citations?hl=ru&amp;user=XP5w_yQAAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=XP5w_yQAAAAJ</a>  <a href="https://orcid.org/0000-0002-5400-2234">https://orcid.org/0000-0002-5400-2234</a>
58.	Bissenbayeva Sanim Begimovna	Scopus <i>h</i> -index=5 Scopus ID: 57210948533  Web of Science <i>h</i> -index=5 ResearcherID: GVS-3072-2022  Google Scholar <i>h</i> -index=6  ORCID iD: 0000-0002-3770-3143	<a href="https://www.scopus.com/authid/detail.uri?authorId=57210948533">https://www.scopus.com/authid/detail.uri?authorId=57210948533</a>  <a href="https://www.webofscience.com/wos/author/record/34243283">https://www.webofscience.com/wos/author/record/34243283</a>  <a href="https://scholar.google.com/citations?hl=ru&amp;user=trBKEgwAAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=trBKEgwAAAAJ</a>  <a href="https://orcid.org/0000-0002-3770-3143">https://orcid.org/0000-0002-3770-3143</a>
59.	Tanybayeva Ainur Kabdrasulovna	Scopus <i>h</i> -index=2 Scopus ID: 57196248174  Web of Science <i>h</i> -index=1 ResearcherID: GHE-6128-2022  Google Scholar <i>h</i> -index=2  ORCID iD: 0000-0003-3943-3009	<a href="https://www.scopus.com/authid/detail.uri?authorId=57196248174">https://www.scopus.com/authid/detail.uri?authorId=57196248174</a>  <a href="https://www.webofscience.com/wos/author/record/4469679,30706512">https://www.webofscience.com/wos/author/record/4469679,30706512</a>  <a href="https://scholar.google.com/citations?hl=ru&amp;user=hMYhy9IAAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=hMYhy9IAAAAJ</a>  <a href="https://orcid.org/0000-0003-3943-3009">https://orcid.org/0000-0003-3943-3009</a>
60.	Shaken Aiman Shakenkyzy	Scopus <i>h</i> -index=3 Scopus ID: 57205342379  Web of Science <i>h</i> -index=2 ResearcherID: DTA-2162-2022  Google Scholar <i>h</i> -index=3  ORCID iD: 0000-0002-6730-6245	<a href="https://www.scopus.com/authid/detail.uri?authorId=57205342379">https://www.scopus.com/authid/detail.uri?authorId=57205342379</a>  <a href="https://www.webofscience.com/wos/author/record/14742567">https://www.webofscience.com/wos/author/record/14742567</a>  <a href="https://scholar.google.com/citations?user=sRK55P8AAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=sRK55P8AAAAJ&amp;hl=ru</a>  <a href="https://orcid.org/0000-0002-6730-6245">https://orcid.org/0000-0002-6730-6245</a>
61.	Nuruly Yeldar	Scopus <i>h</i> -index=2 Scopus ID: 57198426770  Web of Science <i>h</i> -index=1 ResearcherID: V-7078-2017	<a href="https://www.scopus.com/authid/detail.uri?authorId=57198426770">https://www.scopus.com/authid/detail.uri?authorId=57198426770</a>  <a href="https://www.webofscience.com/wos/author/record/V-7078-2017">https://www.webofscience.com/wos/author/record/V-7078-2017</a>

		<p>Google Scholar <i>h</i>-index=3</p> <p>ORCID iD: 0000-0002-9321-2285</p>	<p><a href="https://scholar.google.com/citations?hl=ru&amp;user=0h5q1IEAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=0h5q1IEAAAJ</a></p> <p><a href="https://orcid.org/0000-0002-9321-2285">https://orcid.org/0000-0002-9321-2285</a></p>
62.	Sapiyeva Akmaral Zhenisbayevna	<p>Scopus <i>h</i>-index=1 Scopus ID: 58309908500</p> <p>Web of Science <i>h</i>-index=1 ResearcherID: ABC-9046-2022</p> <p>Google Scholar <i>h</i>-index=2</p> <p>ORCID iD: 0000-0001-7717-8139</p>	<p><a href="https://scholar.google.com/citations?user=ojTfQ5gAAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=ojTfQ5gAAAAJ&amp;hl=ru</a></p> <p><a href="https://www.webofscience.com/wos/author/record/2547787">https://www.webofscience.com/wos/author/record/2547787</a></p> <p><a href="https://scholar.google.com/citations?user=ojTfQ5gAAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=ojTfQ5gAAAAJ&amp;hl=ru</a></p> <p><a href="https://orcid.org/0000-0001-7717-8139">https://orcid.org/0000-0001-7717-8139</a></p>
63.	Yessenov Meirzhan Nurlanovich	<p>Scopus <i>h</i>-index=1 Scopus ID: 57201645228</p> <p>Web of Science <i>h</i>-index=1 ResearcherID: EHQ-8372-2022</p> <p>ORCID iD: 0000-0002-6283-230X</p>	<p><a href="https://www.scopus.com/authid/detail.uri?authorId=57201645228">https://www.scopus.com/authid/detail.uri?authorId=57201645228</a></p> <p><a href="https://www.webofscience.com/wos/author/record/18278772">https://www.webofscience.com/wos/author/record/18278772</a></p> <p><a href="https://orcid.org/0000-0002-6283-230X">https://orcid.org/0000-0002-6283-230X</a></p>
64.	Zhumalipov Aidar Rakhmetovich	<p>Scopus <i>h</i>-index=2 Scopus ID: 56177749400</p> <p>Web of Science <i>h</i>-index=1 ResearcherID: EAK-6446-2022</p> <p>Google Scholar <i>h</i>-index=9</p> <p>ORCID iD: 0000-0003-3315-8827</p>	<p><a href="https://www.scopus.com/authid/detail.uri?authorId=56177749400">https://www.scopus.com/authid/detail.uri?authorId=56177749400</a></p> <p><a href="https://www.webofscience.com/wos/author/record/16566846">https://www.webofscience.com/wos/author/record/16566846</a></p> <p><a href="https://scholar.google.com/citations?hl=ru&amp;user=7ZYiwo8AAAAJ">https://scholar.google.com/citations?hl=ru&amp;user=7ZYiwo8AAAAJ</a></p> <p><a href="https://orcid.org/0000-0003-3315-8827">https://orcid.org/0000-0003-3315-8827</a></p>
65.	Nurkyzy Dinara	<p>ORCID iD: 0000-0001-7921-130X</p>	<p><a href="https://orcid.org/0000-0001-7921-130X">https://orcid.org/0000-0001-7921-130X</a></p>
66.	Kaliyeva Aida Bolatkankyzy	<p>Scopus <i>h</i>-index=0</p> <p>Web of Science <i>h</i>-index=0 ResearcherID: AFI-4744-2022</p> <p>Google Scholar <i>h</i>-index=1</p> <p>ORCID iD: 0000-0002-1324-5192</p>	<p><a href="https://www.webofscience.com/wos/author/record/3673776">https://www.webofscience.com/wos/author/record/3673776</a></p> <p><a href="https://scholar.google.com/citations?user=S8sKeRoAAAAJ&amp;hl=ru">https://scholar.google.com/citations?user=S8sKeRoAAAAJ&amp;hl=ru</a></p> <p><a href="https://orcid.org/0000-0002-1324-5192">https://orcid.org/0000-0002-1324-5192</a></p>
67.	Tokbergenova Aigul Abdugapparovna	<p>Scopus <i>h</i>-index=2 Scopus ID: 57202334262</p> <p>Web of Science <i>h</i>-index=2 ResearcherID: O-2205-2014</p> <p>Google Scholar <i>h</i>-index=3</p> <p>ORCID iD: 0000-0002-1934-5063</p>	<p><a href="https://www.scopus.com/authid/detail.uri?authorId=57202334262">https://www.scopus.com/authid/detail.uri?authorId=57202334262</a></p> <p><a href="https://www.webofscience.com/wos/author/record/1177081">https://www.webofscience.com/wos/author/record/1177081</a></p> <p><a href="https://scholar.google.com/citations?user=9JeZBW4AAAAJ&amp;hl=ru&amp;oi=ao">https://scholar.google.com/citations?user=9JeZBW4AAAAJ&amp;hl=ru&amp;oi=ao</a></p> <p><a href="https://orcid.org/0000-0002-1934-5063">https://orcid.org/0000-0002-1934-5063</a></p>
68.	Kuderin Amanzhol Alimzhanovich	<p>Scopus <i>h</i>-index=1 Scopus ID: 57191840993</p> <p>Web of Science ResearcherID: DVF-7201-2022</p> <p>ORCID iD: 0000-0002-5675-1458</p>	<p><a href="https://www.scopus.com/authid/detail.uri?authorId=57191840993">https://www.scopus.com/authid/detail.uri?authorId=57191840993</a></p> <p><a href="https://www.webofscience.com/wos/author/record/15227602">https://www.webofscience.com/wos/author/record/15227602</a></p> <p><a href="https://orcid.org/0000-0002-5675-1458">https://orcid.org/0000-0002-5675-1458</a></p>



69.	Duisenbayev Salavat Maratovich	ORCID iD: 0000-0003-3146-1996	<a href="https://orcid.org/0000-0003-3146-1996">https://orcid.org/0000-0003-3146-1996</a>
70.	Zulpykharov Kanat Bazarbaevich	Scopus <i>h</i> -index=1 Scopus Author ID: 58055198400  Web of Science <i>h</i> -index=1 Researcher ID: HLG-0490-2023  ORCID iD: 0000-0002-0275-2463	<a href="https://www.scopus.com/authid/detail.uri?authorId=58055198400">https://www.scopus.com/authid/detail.uri?authorId=58055198400</a>  <a href="https://www.webofscience.com/wos/author/record/37950704">https://www.webofscience.com/wos/author/record/37950704</a>  <a href="https://orcid.org/0000-0002-0275-2463">https://orcid.org/0000-0002-0275-2463</a>
71.	Smanov Zhasulan Maratuly	Scopus <i>h</i> -index=6 Scopus ID: 57211743539  Web of Science <i>h</i> -index=3 Web of Science ResearcherID: GGK-1762-2022  ORCID iD: 0000-0002-8182-3978	<a href="https://www.scopus.com/authid/detail.uri?authorId=57211743539">https://www.scopus.com/authid/detail.uri?authorId=57211743539</a>  <a href="https://www.webofscience.com/wos/author/record/30502146">https://www.webofscience.com/wos/author/record/30502146</a>  <a href="https://orcid.org/0000-0002-8182-3978">https://orcid.org/0000-0002-8182-3978</a>
72.	Ryskeldiyeva Aizhan Muratovna	Scopus <i>h</i> -index=1 Scopus ID: 57190757940 ORCID iD: 0000-0002-8677-1150	<a href="https://www.scopus.com/authid/detail.uri?authorId=57190757940">https://www.scopus.com/authid/detail.uri?authorId=57190757940</a>  <a href="https://orcid.org/0000-0002-8677-1150">https://orcid.org/0000-0002-8677-1150</a>
73.	Mussagaliyeva Aizhan Niyazbekovna	Scopus <i>h</i> -index=2 Scopus ID: 57211293422  Web of Science <i>h</i> -index=2 ResearcherID: AAG-9050-2019  Google Scholar <i>h</i> -index=3  ORCID iD: 0000-0001-8041-9247	<a href="https://www.scopus.com/authid/detail.uri?authorId=57211293422">https://www.scopus.com/authid/detail.uri?authorId=57211293422</a>  <a href="https://www.webofscience.com/wos/author/record/1909163">https://www.webofscience.com/wos/author/record/1909163</a>  <a href="https://orcid.org/0000-0001-8041-9247">https://orcid.org/0000-0001-8041-9247</a>
74.	Zhenissova Nazim Yernatkyzy	Web of Science ResearcherID: AFA-7878-2022  ORCID iD: 0000-0003-0618-1204	<a href="https://www.webofscience.com/wos/author/record/3601580">https://www.webofscience.com/wos/author/record/3601580</a>  <a href="https://orcid.org/0000-0003-0618-1204">https://orcid.org/0000-0003-0618-1204</a>
75.	Turymtayev Zhanarys Bakytzhanuly		
76.	Kaliyeva Damira Medetkyzy	Scopus <i>h</i> -index=1 Scopus ID: 58078073100  Web of Science <i>h</i> -index=1 ResearcherID: HOM-8806-2023  ORCID iD: 0000-0002-5151-2204	<a href="https://www.scopus.com/authid/detail.uri?authorId=58078073100">https://www.scopus.com/authid/detail.uri?authorId=58078073100</a>  <a href="https://www.webofscience.com/wos/author/record/38748992">https://www.webofscience.com/wos/author/record/38748992</a>  <a href="https://orcid.org/0000-0002-5151-2204">https://orcid.org/0000-0002-5151-2204</a>
77.	Salmurzauly Ruslan	Scopus <i>h</i> -index=5 Scopus ID: 56610282000  Web of Science <i>h</i> -index=3 ResearcherID:  Google Scholar <i>h</i> -index=6  ORCID iD: 0000-0001-9667-8526	<a href="https://www.scopus.com/authid/detail.uri?authorId=56610282000">https://www.scopus.com/authid/detail.uri?authorId=56610282000</a>  <a href="https://www.webofscience.com/wos/author/record/13602219">https://www.webofscience.com/wos/author/record/13602219</a>  <a href="https://scholar.google.com/citations?user=LtzUoMsAAAAJ">https://scholar.google.com/citations?user=LtzUoMsAAAAJ</a>  ORCID iD: <a href="https://orcid.org/0000-0001-9667-8526">https://orcid.org/0000-0001-9667-8526</a>

78.	Akmoldayeva Bazar Kydyraliyevna		
79.	Tugelbayev Sanat Sayakhmetovich	ORCID iD: 0000-0001-6773-2669	<a href="https://orcid.org/0000-0001-6773-2669">https://orcid.org/0000-0001-6773-2669</a>
80.	Davletkaliyev Bauyrzhan Shynbergenuly		
81.	Skorintseva Irina Borisovna	Scopus <i>h</i> -index=3 Scopus ID: 57191844582  Web of Science ResearcherID: O-6518-2017  ORCID iD: 0000-0002-4791-1384	<a href="https://www.scopus.com/authid/detail.uri?authorId=57191844582">https://www.scopus.com/authid/detail.uri?authorId=57191844582</a>  <a href="https://www.webofscience.com/wos/author/record/O-6518-2017">https://www.webofscience.com/wos/author/record/O-6518-2017</a>  <a href="https://orcid.org/0000-0002-4791-1384">https://orcid.org/0000-0002-4791-1384</a>
82.	Basova Tatyana Anatolyevna	Scopus <i>h</i> -index=2 Scopus ID: 650576472  Web of Science ResearcherID: AAZ-6448-2020  ORCID iD: 0000-0001-6304-5677	<a href="https://www.scopus.com/authid/detail.uri?authorId=650576472">https://www.scopus.com/authid/detail.uri?authorId=650576472</a>  <a href="https://www.webofscience.com/wos/author/record/2082708">https://www.webofscience.com/wos/author/record/2082708</a>  <a href="https://orcid.org/0000-0001-6304-5677">https://orcid.org/0000-0001-6304-5677</a>
83.	Zarechnaya Natalya Borisovna	Web of Science ResearcherID: JOK-6396-2023  ORCID iD: 0009-0005-5349-554X	<a href="https://www.webofscience.com/wos/author/record/51673671">https://www.webofscience.com/wos/author/record/51673671</a>  <a href="https://orcid.org/0009-0005-5349-554X">https://orcid.org/0009-0005-5349-554X</a>
84.	Serikbayeva Gaukhar Kanalbekovna	Scopus <i>h</i> -index=1 Scopus ID:  ORCID iD: 0000-0002-9270-8203	<a href="https://orcid.org/0000-0002-9270-8203">https://orcid.org/0000-0002-9270-8203</a>
85.	Kairova Shnar Galymovna	Scopus <i>h</i> -index=2 Scopus ID: 57202333967  ORCID iD: 0000-0002-4735-8240	<a href="https://www.scopus.com/authid/detail.uri?authorId=57202333967">https://www.scopus.com/authid/detail.uri?authorId=57202333967</a>  <a href="https://orcid.org/0000-0002-4735-8240">https://orcid.org/0000-0002-4735-8240</a>
86.	Bildebayeva Raikhan Malikovna		
87.	Assanbaeva Aisara Alibekkyzy	ORCID iD: 0009-0001-5355-7326	<a href="https://orcid.org/0009-0001-5355-7326">https://orcid.org/0009-0001-5355-7326</a>
88.	Boltayev Sagynysh Serikovich	ORCID iD: 0000-0001-5301-8667	<a href="https://orcid.org/0000-0001-5301-8667">https://orcid.org/0000-0001-5301-8667</a>
89.	Mirzakul Altynbek Bakytuly	ORCID iD: 0000-0002-2222-457X	<a href="https://orcid.org/0000-0002-2222-457X">https://orcid.org/0000-0002-2222-457X</a>