IRSTI
11.25.40

https://doi.org/10.52536/2788-5860.2026.89.1.006

Sanat Kushkumbayev[1], Zhaslan Nurbayev[2], Dinara Aubakirova[3]
[1] Chief Expert of the Department of European and American Studies Kazakhstan Institute for Strategic Studies under the President of the Republic of Kazakhstan, Doctor of Political Sciences, Professor
e-mail: kushkumbayev@yahoo.com
[2] Chief Expert of the Department of Asian Studies KazISS under the President of the Republic of Kazakhstan, Candidate of Historical Sciences, Associate Professor
e-mail: nur1282@mail.ru
(Astana, Kazakhstan)
[3]PhD student of the Department of Regional Studies, L.N. Gumilyov Eurasian National University
e-mail: a_d_n_94@mail.ru
(Astana, Kazakhstan)

FACTORS OF CLIMATE PUBLISHING ACTIVITY IN KYRGYZSTAN: EXTERNAL INFLUENCES AND INTERNAL PRIORITIES

Abstract. The article offers a comprehensive bibliometric overview of climate related publication activity in Kyrgyzstan for 2007–2025 based on a corpus of 252 scholarly works, which enables the identification of the evolution of scholarly interest, its wave like dynamics, and structural transformations of the research agenda over time. The methodological framework encompasses annual and periodized counts of publications, systematization of thematic directions via keywords in titles and abstracts, and substantive analysis of the linkage between research activity and stages of national and international climate processes. The thematic profile is dominated by clusters related to water resources, ecological problematics, and sustainable development. In interpreting the dynamics, the dependence of research activity on external factors-such as international agreements, cooperation, and financing-as well as the impact of global crises that reshape the structure and priorities of research work is underscored. The authors note a deficit of interdisciplinary studies and the underdevelopment of areas concerning social vulnerability, behavioral dimensions, public health, urban adaptation, and migration-gender metrics of climate threats. Overall, the review demonstrates the progressive consolidation of the national climate agenda within scholarly discourse, while persistent gaps between descriptive, analytical, and predictive components highlight the need for their balancing in support of policy and risk management.

Keywords: *climate change, publication activity, bibliometrics, Kyrgyzstan, Central Asia, water resources, energy security, adaptation policy, interdisciplinary research, sustainable development.*

Санат Көшкімбаев, Жасұлан Нұрбаев, Динара Аубакирова

ҚЫРҒЫЗСТАНДАҒЫ КЛИМАТ ЖӨНІНДЕГІ ЖАРИЯЛАНЫМ БЕЛСЕНДІЛІГІНІҢ ФАКТОРЛАРЫ: СЫРТҚЫ ЫҚПАЛДАР ЖӘНЕ ІШКІ БАСЫМДЫҚТАР

Аңдатпа. Мақала 2007–2025 жылдары аралығында Қырғызстандағы климаттық тақырып бойынша публикациялық белсенділікке 252 ғылыми еңбектен тұратын дерекқорға сүйенген кешенді библиометриялық шолуды ұсынады, бұл ғылыми мүдденің эволюциясын, оның толқынды динамикасын және уақыт өте зерттеу күн тәртібінің құрылымдық өзгерістерін айқындауға мүмкіндік береді. Әдіснамалық база жылдар және кезеңдер бойынша жарияланымдарды есепке алуды, атаулар мен аннотациялардағы кілт сөздер арқылы тақырыптық бағыттарды жүйелеуді, сондай ақ ғылыми белсенділіктің ұлттық және халықаралық климаттық үдерістердің кезеңдерімен өзара байланысын мазмұндық талдауды қамтиды. Тақырыптық профильде су ресурстары, экологиялық проблематика және тұрақты даму блоктары басымдыққа ие. Динамиканы интерпретациялау ғылыми белсенділіктің халықаралық келісімдер, ынтымақтастық және қаржыландыру сияқты сыртқы факторларға, сондай ақ зерттеу жұмысының құрылымы мен басымдықтарын өзгертетін жаһандық дағдарыстардың ықпалына тәуелді екенін айқын көрсетеді. Авторлар пәнаралық зерттеулердің тапшылығын және әлеуметтік осалдық, мінез құлықтық өлшемдер, денсаулық сақтау, қалалық бейімделу және миграциялық гендерлік аспектілер бойынша бағыттардың жеткіліксіз дамығанын атап өтіп. Жалпы алғанда, шолу ғылыми дискурста ұлттық климаттық күн тәртібінің дәйекті нығаюын көрсетеді, сонымен бірге саясат пен тәуекелдерді басқару мүддесінде сипаттамалық, аналитикалық және болжамдық компоненттер арасындағы теңгерім қажеттілігін сақтайтынын айғақтайды.

Түйін сөздер: *климаттың өзгеруі, публикациялық белсенділік, библиометрия, Қырғызстан, Орталық Азия, су ресурстары, энергетикалық қауіпсіздік, бейімделу саясаты, пәнаралық зерттеулер, тұрақты даму.*

Санат Кушкумбаев, Жаслан Нурбаев, Динара Аубакирова

ФАКТОРЫ ПУБЛИКАЦИОННОЙ АКТИВНОСТИ ПО КЛИМАТУ В КЫРГЫЗСТАНЕ: ВНЕШНИЕ ВЛИЯНИЯ И ВНУТРЕННИЕ ПРИОРИТЕТЫ

Аннотация. Статья предлагает комплексный библиометрический обзор публикационной активности в Кыргызстане по климатической

тематике за 2007–2025 годы на основе 252 научных работ, что позволяет выявить эволюцию научного интереса, его волнообразную динамику и структурные изменения исследовательской повестки во времени. Методологическая база включает подсчет публикаций по годам и периодам, систематизацию тематических направлений через ключевые слова в названиях и аннотациях, а также содержательный анализ взаимосвязи научной активности с этапами национальных и международных климатических процессов. В тематическом профиле доминируют блоки, связанные с водными ресурсами, экологической проблематикой и устойчивым развитием. В интерпретации динамики подчеркивается зависимость научной активности от внешних факторов, таких как международные договоренности, кооперация и финансирование, а также воздействие глобальных кризисов, меняющих структуру исследовательской занятости и приоритетов. Авторы отмечают дефицит междисциплинарных работ и недостаточную развитость направлений, связанных с социальной уязвимостью, поведенческими аспектами, здравоохранением, городской адаптацией и миграционно-гендерными измерениями климатических угроз. В целом обзор демонстрирует поступательное укрепление национальной климатической повестки в научном дискурсе при сохраняющихся разрывах между описательной, аналитической и прогнозной компонентами и потребностью в их балансировке в интересах политики и управления рисками.

Ключевые слова: *климатические изменения, публикационная активность, библиометрия, Кыргызстан, Центральная Азия, водные ресурсы, энергетическая безопасность, адаптационная политика, междисциплинарные исследования, устойчивое развитие.*

Introduction

In recent decades, climate change has emerged as a central issue both globally and regionally, exerting increasing influence on all aspects of socio-economic development, ecological sustainability, and political dynamics in many countries, including those of Central Asia.

The study of climate change in a national context is critically important for understanding the local manifestations of global climate processes and for the development of suitable adaptation strategies. With growing international attention to climate issues, the analysis of the scientific community's publication activity takes on particular importance in assessing a country's readiness to address climate challenges. This research is based on a comprehensive analysis of 252 scientific publications by Kyrgyz authors from 2007 to 2025, aiming to identify trends and drivers in publication activity in the field of climate research.

Global studies reveal that Central Asia has significant gaps in climate-related research. According to an extensive analysis by Norwegian researchers, out of 13,488 articles published in leading journals on Central Asian studies between 1991 and 2021, only 33 (0.24%) focused on climate change. In this context,

Kyrgyzstan's national publishing activity is of special interest as an example of a local scientific response to global climate challenges [1].

The structure of this study is based on a chronological approach, tracing the evolution of scientific interest in climate issues within the context of international political processes and national development priorities. Particular attention is given to the connection between peaks in publication activity and key events in international climate policy.

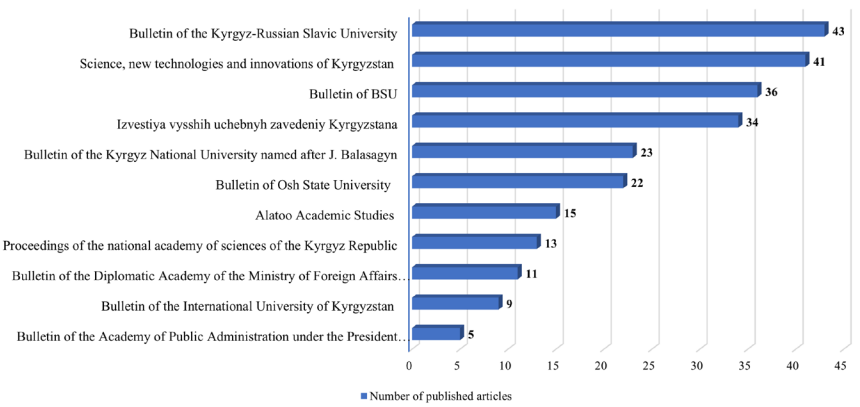
Materials and research methods

The research relies on an aggregated database of publications on climate change in Central Asia, complied from indexed scientific journals of the Kyrgyz Republic during 2007–2025. Bibliometric methods were used for analysis: the number of articles by year, leading journals and authors, and thematic classification by keywords found in titles and abstracts. Content analysis enabled correlation of publication activity dynamics with stages of regional and international climate initiatives. Additionally, a keyword analysis method was used: from each article, words were extracted from the titles and the list of author-provided keywords; after cleaning and normalization, their frequencies were counted. Based on this, a word cloud was generated that clearly shows the leading themes of the corpus (water and water resources, ecology, sustainable development, governance, security, adaptation, and monitoring) and makes it easy to see thematic clusters and the shift of attention toward applied directions.

Results

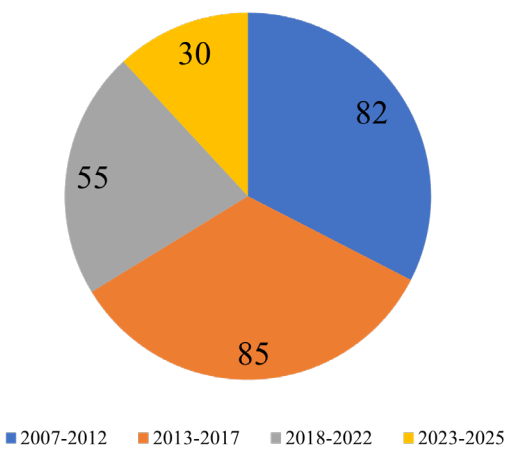
Analysis of publication data shows that climate topics have become firmly established in the research agenda of Kyrgyz scientists. Of all the reviewed articles, 34 contain climate-related terms in their titles, and 80 address climate issues in their abstracts. This indicates that climate topics are not only present but occupy a significant place in the national research discourse.

Figure 1. Distribution of publications by journals



The institutional distribution of publications demonstrates the leading role of the country's major university centers. The Bulletin of the Kyrgyz-Russian Slavic University (Bulletin of KRSU) leads with 43 articles, followed by «Science, New Technologies and Innovation in Kyrgyzstan» with 41. The Bulletin of Bishkek Humanities University (36 articles), Proceedings of Kyrgyz Higher Education Institutions (34), and the Bulletin of Osh State University (23) also contributed significantly. Analyzing institutional distribution helps identify key centers shaping the scientific agenda on climate research in Kyrgyzstan. However, to better understand the development dynamics of this topic, it is also important to examine the temporal distribution of scientific activity. The evolution of publication activity by year reflects how researchers' attention to climate change has shifted under the influence of international agreements, national strategies, and global trends.

Figure 2. Distribution of publications by time period



The 2007–2012 period is marked by intense formation of interest in climate issues, with 82 articles published. The period begins with the activation of international efforts to combat climate change after the Kyoto Protocol came into force in 2005. Central Asian countries began active participation in international climate initiatives, influencing national research priorities. One significant early work is Karimov K.A.'s «Some Problems and Causes of Regional Climate Change» published in 2008 in the Bulletin of KRSU, which laid the foundation for understanding the regional specificity of climate processes. The author analyzed physical factors responsible for lower atmospheric warming and proposed a mechanism related to solar activity cycles to explain climate change [2].

Notably, 2012 saw the highest number of publications (28), directly correlating with preparations for the UN Conference on Sustainable Development (Rio+20), held in June 2012 in Rio de Janeiro. This conference was a turning point in the global approach to sustainable development by merging economic and

environmental objectives. The event attracted representatives from 192 UN member states, including 57 heads of state and 31 prime ministers, creating unprecedented international focus on environmental problems [3]. The outcome was the adoption of «The Future We Want», in which world leaders renewed their commitment to sustainable development. An important result was the initiation of the Sustainable Development Goals (SDGs), building on Millennium Development Goals. These international processes directly impacted national research programs, stimulating scientific activity in ecological and climate studies [4].

Noteworthy is the work of Turdiev T.I. (2011), which linked climate change to economic risks for the country, showing the interconnection between climate and regional security a point underscored by current IPCC assessments of Central Asia's vulnerability to climate change [5]. Podrezov O.A.'s publication (2009) presented a systematic analysis of observed climate trends that met international scientific standards for climate research [6]. Amiraev R.U.'s article on global warming (2011) highlighted climate change issues and their importance for Kyrgyzstan [7].

The peak of research activity occurred from 2013 to 2017. This period saw the highest volume of publications and was characterized by qualitative changes in methodological approaches and thematic diversity. The year 2015 was especially productive (27 articles), coinciding with the adoption of the Paris Agreement on December 12, 2015, at the 21st UNFCCC Conference. For the first time, both developed and developing nations committed to reducing greenhouse gas emissions. The agreement, endorsed by 196 parties and effective from November 4, 2016, differed from the Kyoto Protocol by allowing countries to set their own national targets via nationally determined contributions [8].

This period saw a shift to interdisciplinary approaches combining climatological, economic, and social aspects. For instance, Shatravin V.I.'s works (2015) illustrated diverse methodologies and the shift to predictive studies [9]. Considerable attention was paid to water and energy issues, reflecting the regional specificity of climate challenges. Articles by Mubarakshin B.N. (2013) and Garbuzarova E.G. (2017) highlighted the interaction of climate change and regional security [10].

Several factors contributed to the high publication activity. Increased international funding for climate research following the Paris Agreement fostered research programs. By 2014, Central Asian countries received about $105 million USD for adaptation projects, with Tajikistan being the largest beneficiary. Collaboration with international research centers and growing awareness of the practical importance of climate studies for national planning also enhanced scientific activity. GIZ programs such as «Sustainable Use of Natural Resources in Central Asia» (2002–2015) and «Ecosystem-Based Approach to Climate Resilience in Mountain Regions of Asia» (2015–2019) provided technical and financial support for research [11].

The 2018–2022 period experienced a marked drop in publication activity (55 articles), a decline of nearly 35% from the previous period. The drop was especially steep in 2020–2021 (6 and 8 articles, respectively), likely a result of

the global COVID-19 pandemic. Globally, research initiatives suffered: only around 9% of scientists started no new projects in 2019, but this share tripled to 27% in 2020 [12].

Despite the quantitative decline, the quality of publications during this period shows deeper research approaches and increased practical orientation. Many works became more applied, focusing on concrete aspects of adaptation to climate change. Publications on renewable energy (Zhoroev A.M., 2018; Arbaev K.A. et al., 2018) reflected the search for practical solutions to climate issues [13] [14].

Articles on energy security, such as «Technogenic Threats and Ensuring the Energy Security of the Kyrgyz Republic» by Kasymova V.M. and colleagues (2022), demonstrate the integration of climate issues with national security [15]. Razuvaev A.V. and Sarmaev A.V. continued this trend in their 2023 work, linking energy and climate agendas [16].

The contemporary period (2023–2025), with 29 published articles, also saw qualitative changes in research approaches. There is increasing attention to local aspects of climate change and its effects on key sectors of the economy and social sphere. Research has become more practice-oriented, aiming to solve specific national problems. This period is marked by the interdisciplinary nature of research and its connection to practical sustainable development objectives. Studies demonstrate the integration of traditional climatological approaches with modern technological solutions and socio-economic research.

A good example is the 2023 publication by Glazunov D.V. and co-authors, which described the development of methods for studying Bishkek's ecological situation using a mobile environmental laboratory. This work, published in the Bulletin of KRSU, illustrates the integration of technology with environmental monitoring objectives [17].

Thematic analysis of the publications reveals several primary research directions reflecting the specifics of Kyrgyzstan's climate challenges. Water resources are central (39 mentions), highlighting their crucial role for the mountainous country amid climate change. This focus matches international assessments of water's importance for climate adaptation in Central Asia.

Currently, there is a stronger integration of national research with international climate initiatives. Partnerships with the Global Environment Facility (GEF) and UNDP play a crucial role in advancing environmental solutions, protecting biodiversity, community empowerment, and building climate resilience. Projects include support for adaptation planning led by UNDP, aimed at strengthening institutions and improving the coordination of climate adaptation planning [18].

Ecological topics are broadly represented (30 ecology mentions, 20 ecological security mentions), indicating a comprehensive approach by Kyrgyz researchers. Sustainable development is featured in 27 publications, demonstrating the link between climate research and long-term planning in line with international trends. Regional focus is evident from frequent references to Central Asia (24 times) and Kyrgyzstan (19 times), signifying researchers' understanding of local

climate processes. Transboundary rivers are mentioned 12 times, underscoring the importance of international cooperation in addressing climate problems.

This focus aligns with international approaches to climate studies in Central Asia, characterized by high vulnerability and temperatures rising faster than the global average. Climate change consequences for the region include retreating glaciers, unstable river flows, soil degradation, and effects on agriculture [1].

Figure 3. Frequent mentions of keywords

Thus, the thematic direction of Kyrgyz climate research demonstrates an adequate understanding of regional challenges and alignment with global trends in climate studies. A balanced representation of water, ecological, and socio-economic issues forms a solid foundation for comprehensive climate analysis, though further development of interdisciplinary approaches and greater attention to practical adaptation aspects are needed to enhance the effectiveness of science's contribution to solving national climate issues.

Conclusion

The conducted analysis of publication activity on climate change in Kyrgyz research yields several important findings. From 2007 to 2025, academic interest in this issue has evolved dynamically, reflected by a growing volume of publications, diversification of topics, and new areas of study—such as water and energy security, climate adaptation, and sustainable development.

The review of 252 scientific publications clearly demonstrates the correlation between national research activity and international climate processes. Peaks of research activity in 2012 and 2015 show the high degree of integration of Kyrgyzstan's science into the global climate agenda. However, it is also possible

to trace dependence on external factors, most notably the COVID-19 pandemic period when publication activity dropped by more than half.

The methodological development of Kyrgyz climate research shows a positive transition from descriptive work to analytical and predictive studies, indicating scientific experience accumulation and growing research interest. However, the methodological structure of publications shows a marked imbalance: the majority are descriptive and empirical, while truly interdisciplinary approaches focused on forecasting, behavioral aspects, and social vulnerability are much less common. Predominance of either natural sciences or socio-political approaches reveals insufficient integration between disciplines.

The thematic structure of research reflects the regional specificity of climate challenges but also reveals gaps. Topics like public perceptions of climate risk, adaptation practices at regional/national levels, and gender or migration effects are underrepresented. There is a lack of attention to climate-related healthcare, urban adaptation, and socio-economic impacts, highlighting the need to broaden the research agenda and attract approaches considering the social dimension of climate threats.

There is also a need for greater integration of international experience and advanced methodology, including the analysis of climate threats' impact on the resilience of various economic, health, and social sectors. The development of the research technological base through remote sensing, climate modeling, and geographic information systems could significantly enhance the practical applicability of work.

REFERENCES:

1. Vakulchuk R., Daloz A.S., Overland I., Sagbakken H.F., & Standal K. (2022). A void in Central Asia research: climate change. Central Asian Survey. 2022. – 42(1). P.1–20. https://doi.org/10.1080/02634937.2022.2059447
2. Karimov K.A. Nekotorye problemy i prichiny regional'nyh klimaticheskih izmenenij [Some problems and causes of regional climate change], Bulletin of the KRSU, 2008, Vol 8, No 10, P. 149-154. [in Russian]
3. United Nations Conference on Sustainable Development (Rio+20). United Nations. – 2021 [Electronic resource]. Available at: https// www.un.org /en/ conferences/environment/rio2012 (Accessed: 01.08.2025)
4. Sustainable Development Knowledge Platform. United Nations Conference on Sustainable Development, Rio+20. – 2012. [Electronic resource]. Available at: https://sustainabledevelopment.un.org/rio20 (Accessed: 01.08.2025)
5. Turdiev T.I. Gornye ledniki Kyrgyzstana: ekologo-ekonomicheskaya opasnost' [Mountain glaciers of Kyrgyzstan: ecological and economic danger], Vestnik KRSU, 2011, Vol. 11, No. 3, P. 60-64. [in Russian]
6. Podrezov O.A. Izmenenie sovremennogo klimata [Modern climate change], Vestnik KRSU, 2009, Vol. 9, No 1, P. 123-138. [in Russian]
7. Amiraev R.U. Global'nye klimaticheskie izmeneniya [Global climate change], Vestnik KRSU, 2011, Vol 11, No 3, P. 65-70. [in Russian]
8. The Paris Agreement. – 2015. [Electronic resource]. Available at: https:// www.un.org/en/climatechange/paris-agreement (Accessed: 02.08.2025).

9. Shatravin V.I. Osnovnye problemy dolgosrochnogo prognozirovaniya klimaticheskih i lednikovyh izmenenij Central'noj Azii i sposob ih razresheniya [The main problems of long-term forecasting of climatic and glacial changes in Central Asia and the way to resolve them], Vestnik KRSU, 2015, Vol. 15, No. 3, P. 155-158. [in Russian]
10. Garbuzarova E.G. Vodno-energeticheskaya dilemma central'noaziatskih gosudarstv: vozmozhny li vooruzhennye stolknoveniya? [The water and energy dilemma of the Central Asian states: are armed clashes possible?], Vestnik KRSU, 2017, Vol. 17, No. 4, P. 40-44. [in Russian]
11. Karina Zh. Review of the implementation of the environmental conventions in Central Asia. – 2018. [Electronic resource]. Available at: https://carececo.org/publications/Review%20of%20the%20implementation%20of%20MEAs%20in%20CA.pdf (Accessed: 02.08.2025).
12. Gao, J., Yin, Y., Myers, K.R. et al. Potentially long-lasting effects of the pandemic on scientists. Nat Commun 12, 61. 88. 2021. https://doi.org/10.1038/s41467-021-26428-z.
13. Zhoroev A.M. Analiz energosberezheniya za schet ispol'zovaniya vozobnovlyaemyh istochnikov energii v Kyrgyzstane [Analysis of energy saving through the use of renewable energy sources in Kyrgyzstan], Vestnik OshGU, 2018, No. 1, P.45-48. [in Russian]
14. Arbaev K.A., Arbaev T.K., Kaldybaev B.K. Perspektivy ispol'zovaniya al'ternativnyh istochnikov energii v Kyrgyzstane [Prospects of using alternative energy sources in Kyrgyzstan], Vestnik OshGU, 2018, No. 4, P. 6-9. [in Russian]
15. Kasymova V.M., Guseva V.I., Kurdyukova G.N. Tekhnogennye ugrozy i obespechenie energeticheskoj bezopasnosti Kyrgyzskoj Respubliki [Man-made threats and ensuring energy security of the Kyrgyz Republic], Vestnik KRSU, 2022, Vol. 22, No. 12, P.12-19. [in Russian]
16. Razuvaev A.V. Sarmaev A.V. Aktualizaciya energeticheskoj bezopasnosti ob"ektov razlichnoj infrastruktury [Updating the energy security of various infrastructure facilities], Vestnik KRSU, 2023, Vol. 23, No. 12, P.60-67. [in Russian]
17. Glazunov D.V., Sovetbekov B., Samyleva A.A. Razrabotka metodologii issledovanij ekologicheskoj obstanovki goroda Bishkeka na baze peredvizhnoj ekologicheskoj laboratorii [Development of a methodology for studying the ecological situation of Bishkek on the basis of a mobile ecological laboratory], Vestnik KRSU, 2023, Vol. 23, No. 8, P. 60-67. [in Russian]
18. Partnership with the Global Environment Facility 2025. UNDP Kyrgyzstan. – 2025. [Electronic resource]. Available at: https:// www.undp.org/ kyrgyzstan/ publications/partnership-global-environment-facility-2025 (Accessed: 02.08.2025).