

Annual Security Conference Report

December 16-17, 2024

OPENING REMARKS

On December 16-17, 2024, the OSCE Academy in Bishkek hosted the Annual Security Conference in a hybrid format. This conference focused on three aspects of human security: Food Security, Energy Security, and Cybersecurity. Organized in partnership with the University of Siena and generously supported by the Norwegian Institute of International Affairs (NUPI), the conference brought together experts, researchers, and esteemed guests to address key global challenges and explore innovative solutions. Forty-four participants took part in the conference offline and 39 joined the conference online.

The conference was opened with remarks from **Dr. Pal Dunay, Interim Director of the OSCE Academy**, who stressed the significance of prioritizing “phenomena over actors” in security discussions – a perspective overshadowed by the resurgence of great power competition. He highlighted the enduring importance of environmental, energy, and cybersecurity issues, particularly in the context of Central Asia. Dr. Dunay also reflected on the OSCE Academy’s achievements in academic and research initiatives, emphasizing its dedication to regional inclusivity, while expressing gratitude to donors and welcoming the distinguished speakers.

Ms. Ekaterina Nakashidze, Deputy Head of the OSCE Programme Office in Bishkek, followed with a message of gratitude to the organizers and donors. She addressed the environmental and energy challenges facing Central Asia, such as desertification, water scarcity, and reliance on carbon-intensive energy sources, using the Aral Sea as a poignant example of environmental mismanagement. However, she also highlighted positive developments, such as the transboundary commissions on the Talas and Chui rivers, and advocated for sustainable solutions through regional cooperation, international partnerships, and community engagement. Ms. Nakashidze emphasized the urgency of balancing economic growth with environmental stewardship to ensure a sustainable future.

H.E. Ambassador Bakyt Dzhusupov, Coordinator of the OSCE’s Economic and Environmental Activities in Vienna, highlighted the interconnected nature of climate change, energy, food, and water security. He discussed OSCE initiatives such as gender-inclusive water management, renewable energy projects, and regional cooperation efforts in Central Asia. Ambassador Dzhusupov underscored the importance of resilience and collaborative approaches to climate-related risks and emphasized educational programmes aimed at sharing best practices in climate and water management, particularly among women in Central Asia and Afghanistan.

KEYNOTE SPEECH

The keynote speech was delivered by **Professor Matteo Gerlini from the Department of Political and International Sciences, University of Siena in Italy**. Dr. Gerlini's presentation provided a comprehensive overview of evolving nuclear security challenges in the context of global political and technological shifts. It highlighted how nuclear security has transformed over time, moving from a focus on state-centric threats to addressing the complexities posed by non-state actors, hybrid warfare, and technological advancements. Key historical developments included the A.Q. Khan network's proliferation activities, the rise of nuclear black markets, and the increasing involvement of non-state actors, such as paramilitary groups, in nuclear-related threats.

The presentation explored the risks associated with radiological materials, including the use of "dirty bombs," and underscored the challenges of securing radioactive sources commonly used in medicine, industry, and science. International legal frameworks, such as ICSANT, CPPNM, and UNSC Resolution 1540, were identified as critical tools for combating proliferation. The presentation noted challenges in maintaining effective international collaboration, particularly in the context of geopolitical tensions like the war in Ukraine.

Emerging concerns, such as the potential misuse of small modular reactors and plutonium in the nuclear fuel cycle, were also discussed. While nuclear power is being revisited as part of the green transition, ensuring security in this domain remains paramount. The role of the IAEA and the Non-Proliferation Treaty were emphasized as vital to safeguarding against nuclear threats. The speaker concluded by advocating for a shift from universal treaties to more flexible approaches, such as so-called "gift basket diplomacy," focusing on like-minded states to achieve targeted solutions. The integration of nuclear energy promotion with robust security measures was identified as critical for addressing both current and future risks.

The two-day conference comprised six panels, including a side event based on the initiative and conference series "Drops of the Future" that was conducted by the OSCE Secretariat. The panel sessions concluded with Q&A involving the audience in discussion of the panel themes and speakers' presentations.

PANEL I: ENERGY

The first day started with a panel session on energy. It was moderated by **Dr. Fabio Indeo, a Researcher at University of Siena in Italy**.

Dr. Pengfei Hou, Associate Professor at Xinjiang University in China, delivered the first presentation titled "Second Time as Farce? Nuclear Power Development in Central Asia." He

explored the revival of nuclear power development in Central Asia, focusing on Kazakhstan, Kyrgyzstan, and Uzbekistan. As the region transitions to sustainable energy, these states are embracing nuclear energy to address energy security while grappling with the toxic nuclear legacy of the Soviet Union. Kazakhstan plans to incorporate nuclear power in its energy mix by 2030, leveraging its uranium resources, while Kyrgyzstan has lifted restrictions on uranium exploration and is collaborating with Russia on rehabilitating mining sites. Uzbekistan, meanwhile, has partnered with Rosatom to construct a nuclear power plant in the Jizzakh region. Dr. Hou highlighted the duality of energy's role in Central Asia – shaped by fossil fuel reliance and the potential of nuclear power to redefine energy identities and drive sustainable development. Challenges remain in overcoming entrenched fossil fuel dependency and integrating nuclear energy into national strategies, especially in the context of the Russian-Ukrainian conflict, which underscores the need to diversify energy infrastructure and reduce reliance on Russian resources. Ultimately, Central Asia's nuclear revival reflects a broader effort to balance historical legacies with aspirations for economic growth, energy security, and geopolitical resilience.

Following Dr. Hou, **Ms. Evrim Eken, a PhD candidate at St. Petersburg State University**, provided an in-depth analysis of “Contemporary Russian Energy Policy towards Central Asia and the Caucasus: Its Capabilities, Limits and Implications for Regional Energy Security.” She explored Russia's evolving energy policy toward Central Asia and the Caucasus (CAC) and its implications for regional energy security. Russia leverages its extensive gas export infrastructure to supply energy to both Asian and European markets through CAC countries, maintaining a strategic advantage due to the region's landlocked nature and reliance on fossil fuels. However, challenges such as declining gas reserves, increasing domestic demand, financial constraints, and regional energy transition goals in countries like Uzbekistan and Kazakhstan pose significant risks to Russia's influence. Additionally, geopolitical competition involving China, the EU, Turkey, and Iran further complicates its position. Despite these challenges, Russia continues to play a pivotal role in CAC energy security, balancing opportunities for collaboration with the risk of losing dominance in an evolving energy landscape marked by sustainability goals and rising competition.

The third contributor to the panel, **Professor Simon Yin, Director of the Research Center for the Belt and Road Initiative at Hefei University in China**, discussed the “Implications of China's Belt and Road Initiative [BRI] on Energy Security in Central Asia.” He presented the impact of China's BRI on Central Asia's energy security, highlighting its economic and geopolitical implications. Since its launch in 2013, the BRI has made China the region's dominant economic partner, financing oil and gas pipelines, renewable energy projects, and power infrastructure. While these investments enhance energy connectivity, concerns remain over economic dependence, debt sustainability, and the limited local benefits as Chinese firms often rely on imported labor and materials. Key projects such as the Middle Corridor in

Kazakhstan, the Rogun hydropower plant in Tajikistan and the China-Kyrgyzstan-Uzbekistan railway illustrate both the opportunities and challenges of Chinese engagement. The presentation also discussed China's role in shaping regional energy policies and leading green energy initiatives. Professor Yin concluded that while the BRI is transforming Central Asia's energy landscape, its long-term impact will depend on how China balances economic expansion with regional concerns and how Central Asian states negotiate their interests.

PANEL II: ENERGY

The second panel, moderated by **Professor Gerlini**, continued on the topic of energy. **Dr. Fabio Indeo** launched the session with his presentation on "Turkmenistan and the Hydrogen Potential: New Perspectives and Old Challenges." Dr. Indeo's presentation analyzed Turkmenistan's potential for developing a hydrogen economy as part of its energy transition strategy. As a key player in Central Asia, Turkmenistan aims to enhance energy security, diversify its economy, and reduce greenhouse gas emissions. The National Strategy for Renewable Energy Development (2030) includes hydrogen integration, supported by pilot solar and wind projects leading to large-scale green and blue hydrogen production. However, challenges such as high methane intensity from natural gas extraction and limited water resources for electrolysis remain. Long-term strategies include repurposing gas pipelines for hydrogen transport and collaborating with regional partners to establish export routes. While Turkmenistan's location and energy resources offer leadership potential in hydrogen development, overcoming geopolitical tensions, infrastructure limitations, and technical gaps is crucial. International cooperation, particularly with the EU, was emphasized as key to success.

Further, **Dr. Serhat Suha Çubukçuoğlu, Director of Turkey Program and a member of the advisory council at TRENDS Research & Advisory in UAE**, spoke on "Türkiye's Natural Gas Policy: Economics, Security, Diplomacy." He delivered his analysis of Türkiye's natural gas strategy, emphasizing the country's critical geopolitical role as an energy hub connecting Europe, Asia, and Africa. Türkiye's energy policy is shaped by its high dependency on natural gas, which accounts for a significant portion of its energy consumption, and its reliance on imports, primarily from Russia, Iran, and Azerbaijan. This dependency poses both economic and geopolitical vulnerabilities, especially during periods of international energy market volatility. The presentation highlighted Türkiye's efforts to diversify its energy mix by increasing its liquefied natural gas capacity, exploring domestic gas reserves in the Black Sea, and pursuing renewable energy projects to reduce dependence on imports. Dr. Çubukçuoğlu outlined key policy recommendations, including the renegotiation of pipeline contracts, prioritizing energy efficiency, and expanding renewable energy investments to align with Türkiye's carbon neutrality goal by 2053. Additionally, the presentation explored the role of Türkiye as a regional energy transit hub, leveraging its strategic location to facilitate the transportation of natural gas between resource-rich regions and Europe. Balancing energy security, economic stability, and

environmental sustainability remain a central challenge for Türkiye as it navigates its energy transition.

The panel continued with **Dr. Farkhod Aminjonov, an Assistant Professor of Strategy and Security Studies at the National Defence College in the UAE** who presented on “Navigating Central Asia's Energy Transition Strategies.” His presentation focused on the urgent need for Central Asia to transition from its traditional reliance on fossil fuels to a sustainable, renewable energy system. The region faces critical challenges, including aging energy infrastructure, frequent power outages, and high greenhouse gas emissions. Investment in grid capacity and modernization of infrastructure is essential to support renewable energy integration and meet national and international climate targets. For instance, Uzbekistan aims for 40% of its energy to come from renewable sources by 2024, while other countries in the region are working to reduce methane emissions as part of the Global Methane Pledge. However, significant barriers exist, including inadequate financing, insufficient technical expertise, and limited regional collaboration. Dr. Aminjonov emphasized the importance of developing comprehensive roadmaps for energy transitions that include transparency, stakeholder engagement, and robust governance structures. The presentation highlighted examples of successful renewable energy projects in the region and called for increased international cooperation to attract investment, enhance technical capacity, and address regional disparities. Achieving a low-carbon energy future in Central Asia requires a multi-faceted approach that balances economic, environmental, and social priorities.

Finally, **Ms. Farzona Rakhimova**, a graduate student at the University of World Economy and Diplomacy in Tashkent, Uzbekistan, concluded the panel with her presentation on “Energy Security in Central Asia: Pathways for Cooperation with the GCC [Gulf Cooperation Council] Region.” Her presentation examined the potential for energy security cooperation between Central Asia and the GCC, highlighting opportunities and challenges in fostering collaboration. Key drivers for such cooperation include Central Asia’s need to address its energy security challenges, such as outdated infrastructure, reliance on fossil fuels, and vulnerability to climate change impacts. GCC countries, known for their significant investments in renewable energy technologies and climate initiatives such as the Middle East Green Initiative, present a valuable partner for Central Asia in diversifying energy sources and advancing sustainable development goals. The presentation underscored the importance of hydropower projects and renewable energy development, which align with the climate neutrality targets of both regions. However, significant challenges were identified, including geopolitical tensions, logistical issues with outdated transport routes, and the complexity of establishing cross-regional energy infrastructure. The speaker emphasized the importance of strategic investments in emerging technologies such as carbon capture, renewable energy projects, and hydrogen infrastructure. These investments could not only improve environmental and energy outcomes but also enhance regional stability and foster stronger economic ties between Central Asia and the GCC.

SIDE EVENT “DROPS OF THE FUTURE”

The “Drops of the Future” side event was opened by Dr. Dunay who introduced the speakers of the session. This segment of the programme aimed to highlight the OSCE’s role in the Water-Energy-Food (WEF) Nexus and its connection to regional and international security. The side event included panels III and IV.

PANEL III: TECHNOLOGY AND INNOVATION FOR THE WEF NEXUS

The third panel session, moderated by **Ms. Raquel Moya Martinez from the OSCE Secretariat**, provided an overview of the joint vision for a sustainable WEF nexus in Central Asia and collaborative efforts to develop a forward-looking strategy. Ms. Moya Martinez highlighted the OSCE’s work within the economic and environmental dimension of security, focusing on energy security and water management as key pillars of regional stability, sustainable development, and environmental resilience. She emphasized the interdependence of water and energy, which inspired the “Drops of the Future” initiative and aligns with OSCE’s broader efforts to “**Promote Women’s Economic Empowerment in the Energy Sector in Central Asia**”, an OSCE project financed by Austria, France, Germany, Italy, Norway and Poland.

As part of this commitment, the OSCE actively supports the clean energy transition in the region through scholarships, mentoring programmes, energy access, and capacity-building efforts. These initiatives aim to equip Central Asian women with the skills and opportunities needed to become agents of change while fostering a just and inclusive energy transition that leaves no one behind.

Additionally, she underscored the importance of policy, political will, and data sharing in addressing transboundary water and energy challenges. Engaging diverse stakeholders, particularly youth and women, is crucial for fostering inclusive discussions and ensuring reliable data to support informed decision-making at local and regional levels.

Titled “Technology and Innovation for the WEF Nexus,” the panel session featured members of the Drops of the Future workshop: **Ms. Gulzhan Makhmudova, a member of the Women in Water Management Network in Central Asia and Ms. Gulderay Iklassova, a Sustainable Agriculture Specialist**. Panelists explored the role of technology and digital tools in enhancing water, energy, and food security, discussed innovations for climate resilience and adaptation, and shared case studies from Central Asia showcasing successful WEF applications. **Ms. Makhmudova** discussed key technological advancements in water management for Central Asia, focusing on two main initiatives. The first is the electronic Water User Association programme developed by NGO Camp Alatoo which optimizes water distribution by integrating data on crops, soil types, and water flow. This system not only enhances efficiency but also helps

prevent conflicts among water users and has the potential to be scaled for transboundary regulation. She also highlighted its gender-friendly design, making water management more accessible. The second initiative is an early warning system for flood and mudflow prevention in the Fergana Valley, one of Central Asia's most climate-vulnerable regions. Funded by the European Union and implemented by the UNDP, this system has already installed several monitoring stations across Uzbekistan, Tajikistan, and Kyrgyzstan. Ms. Makhmudova emphasized the importance of rapid response mechanisms for climate-related disasters and the need to expand such technologies for transboundary cooperation.

Ms. Iklassova emphasized the need to reframe agriculture from being a major consumer of natural resources to a system integrator that turns constraints into opportunities. With agriculture accounting for 70% of global freshwater use and 30% of global energy demand, she highlighted the role of digital tools in enhancing sustainability and resilience. She introduced several technologies already being implemented in Central Asia, such as in-field variability mapping to analyze soil texture, color infrared imagery for monitoring crop health, and Citrus Yield Mapping to track crop performance using specialized software. Additionally, she discussed Variable Rate Technology, which optimizes fertilizer, chemical, and seed use based on real-time soil and crop data, reducing waste and improving efficiency. By integrating traditional knowledge with modern innovations, these technologies contribute to more sustainable and equitable agricultural practices within the water-energy-food nexus.

PANEL VI: PANEL VI: TRADITIONS IN THE REGION AND THEIR RELEVANCE TO ADDRESSING THE WEF

The panel session was moderated by **Ms. Letizia Zuliani from the OSCE Secretariat**. The session on “Traditions in the Region and Their Relevance to Addressing the WEF Nexus” examined traditional methods of managing water, energy, and food production and consumption in the region, emphasizing how these practices can complement modern WEF solutions. Ms. Zuliani discussed transboundary water cooperation and the inclusion of women in Central Asia and Afghanistan. Given the region's growing water security challenges – exacerbated by climate change, glacier melt, and desertification – OSCE approaches water as a security issue, integrating a gender perspective since 2014 through the **ExB Project “Women, Water Management and Conflict Prevention”**. Women have traditionally played a key role in managing water resources, yet they remain underrepresented in transboundary water negotiations and decision-making processes. To address this gap, the project aims to build the capacity of women water professionals through the Women in Water Diplomacy Network, now a global initiative that connects women diplomats from Central Asia, Africa, and the Americas. Additionally, the project has a strong youth component, empowering young women in the water sector to contribute to sustainable and inclusive water governance. The Phase III of the project is funded by the Governments of Finland, Germany, Switzerland and Liechtenstein.

The panel featured **Ms. Meerim Seidakmatova, an IWRM Specialist and Youth Advocate, and Ms. Alexandra Mussina, an Environmental Enthusiast and Lawyer.** Ms. Seidakmatova highlighted that traditional knowledge in the water sector across the region is often highly technical and not easily accessible to younger generations due to age and gender biases. To bridge this gap, efforts are being made to facilitate meaningful exchanges between different generations working not only in water management but also in related fields such as food, agriculture, and energy. One key initiative is the development of a platform for intersectoral and intergenerational knowledge transfer. Examples include the Women in Water Management Network in Central Asia and Afghanistan, as well as the Women in Water Diplomacy Network, both of which aim to empower women and foster collaboration in water governance.

Ms. Mussina emphasized that while legal protections for youth, women, and human rights exist in Central Asia, their enforcement remains weak, often leaving individuals discouraged from speaking up. She noted that societal norms continue to impose rigid expectations on women, prioritizing family and obedience over personal and professional aspirations. One potential solution lies in intergenerational influence within families. She highlighted how many women in science in Kazakhstan were inspired by their scientist parents, demonstrating the crucial role family support plays in breaking traditional barriers and fostering scientific and professional growth for women.

The event concluded with a Q&A session and closing reflections, outlining planned activities, partnerships, and key objectives for the upcoming year. The discussion also explored opportunities for continued collaboration and regional youth engagement in WEF Nexus initiatives.

PANEL V: CYBERSECURITY

The second day of the conference proceeded with a panel session on cybersecurity. The session was moderated by **Dr. Scott Abel, lecturer at the Estonian Business School in Tallinn.** The first speaker, **Mr. Oleg Shakirov, a PhD Candidate at the Johns Hopkins School of Advanced International Studies,** did a presentation on “Death by a Thousand Cuts: Non-Catastrophic Cyber Attacks in Conflict and Their Impact.” His presentation focused on the concept of “non-catastrophic cyber attacks” in conflicts, challenging the widespread perception that cyber warfare is always catastrophic. Unlike large-scale disruptions, non-catastrophic attacks are frequent, opportunistic, and harder to measure in terms of impact. Drawing on examples from cyber attacks targeting Russia between 2022 and 2024, the presentation explored actions such as website defacements, data theft, and malware deployment. These attacks, often described as “death by a thousand cuts,” aim to impose costs on adversaries by exploiting vulnerabilities, spreading damage across economic sectors, and creating cascading effects. The speaker

emphasized the difficulties in addressing such attacks due to attribution challenges, insufficient norms, and their routine, low-profile nature. Additionally, defenders face growing challenges with an expanding attack surface and the varying maturity levels of organizations involved. Solutions included improving target resilience, preventing cascading effects, and accelerating recovery efforts. Mr. Shakirov concluded that while non-catastrophic attacks may lack high-profile devastation, they pose significant challenges for diplomats and defenders, underscoring the need for strategic preparation and international collaboration.

The second panelist **Ms. Grace X. Yang, a PhD Candidate at the Free University of Berlin**, discussed “Sino-Russian Cybersecurity Cooperation and Its Implications for the Digital Silk Road.” She examined the deepening Sino-Russian cybersecurity cooperation and its implications for China’s Digital Silk Road in Eurasia. Both countries advocate for cyber sovereignty, emphasizing state control over cyberspace and resisting Western influence in global cyber governance. Their collaboration intensified after Western sanctions on Russia in 2014, leading to joint efforts in technical exchanges, law enforcement cooperation, and cyber threat response coordination within multilateral frameworks such as the Shanghai Cooperation Organization (SCO), BRICS, and the UN. The SCO has played a key role in promoting cybersecurity norms, supporting agreements on international information security and fostering initiatives like the Regional Anti-Terrorist Structure (RATS) to combat cyber threats linked to terrorism, separatism, and extremism. Additionally, China has used the SCO as a platform to expand the Digital Silk Road, integrating cybersecurity measures into its infrastructure projects led by Huawei and ZTE. However, challenges persist, including differences in national priorities, a history of mutual distrust, and China’s economic and technological dominance over Russia. While Sino-Russian cyber cooperation strengthens their geopolitical influence, internal frictions and growing external competition, particularly with the United States, may threaten the long-term stability of this alliance.

Following Ms. Yang, **Mr. David Shakarishvili, a PhD Candidate at Klaipeda University** presented on “The Role of the UN’s Open-Ended Working Group in Developing International Norms for Cyber Peace and Security.” Mr. Shakarishvili’s provided analysis of the UN Open-Ended Working Group (OEWG) on cybersecurity and its role in developing international norms for cyber peace and security. With cyber threats becoming increasingly complex and transnational, the OEWG has made progress in setting norms for responsible state behavior, capacity-building, and confidence-building measures to reduce escalation risks. Success stories include collaborations on protecting critical infrastructure, particularly in healthcare, and the inspiration provided for regional agreements such as the African Union’s cybersecurity frameworks. However, the presentation also addressed the limitations of the OEWG, including challenges in enforcing norms and ensuring inclusivity in the decision-making process. The inclusion of non-state stakeholders, such as the private sector, academia, and civil society, was emphasized as a critical factor in promoting technical expertise and advocating for a human rights-based approach to cyberspace governance. Lessons from the OEWG’s work underscore

the importance of transparency, trust-building, and regional cooperation. The presentation concluded with a forward-looking perspective on enhancing cyber norms to ensure global stability in an interconnected digital world.

The final presenter, **Ms. Dilbar Abdugafurova, Co-Founder of Guidance Academy**, explored “Enhancing Cybersecurity through International Partnerships.” Ms. Abdugafurova highlighted the critical importance of cybersecurity in safeguarding economies, protecting critical infrastructure, and maintaining public trust in a rapidly digitalizing world. As the global digital economy is projected to contribute over \$20.8 trillion to GDP by 2025, the growing dependence on technology introduces unprecedented vulnerabilities. The escalating cost of cybercrime, expected to reach \$10.5 trillion by 2025, underscores the need for robust international collaboration. The presentation emphasized the role of international frameworks and partnerships in addressing transnational cyber threats. The Global Cybersecurity Index identifies five key pillars for effective cybersecurity: legal, technical, and organizational measures, capacity development, and cooperation. Highlighting initiatives such as the Paris Call for Trust and Security in Cyberspace and the Cyber Threat Alliance, the speaker advocated for real-time intelligence sharing and globally accepted norms for responsible state behavior in cyberspace. Strengthening regional alliances, particularly in under-resourced regions like Central Asia, and engaging public-private partnerships were identified as vital strategies. Such collaborations can enhance preparedness, secure critical infrastructure, and foster a unified global response to evolving cyber threats.

PANEL VI: FOOD SECURITY

The final panel, moderated by **Dr. Kadyrbek Sultakeev, Assistant Professor at the American University of Central Asia**, focused on food security. It began with a presentation by **Ms. Salima Bekbolotova, a Doctoral Researcher at the Leibniz Institute for Agricultural Development in Transition Economies**, who shared her on-going research on “Food (In)Security Dynamics in Kyrgyzstan, 2013-2022.” Dr. Bekbolotova examined food security trends in Kyrgyzstan over the past decade, analyzing household and subpopulation-level data. She highlighted limited data availability and inconsistencies in food insecurity measurements as key barriers to fully understanding the issue. Using the innovative probabilistic approach to food insecurity, such as the Probability of Food Security metric, and leveraging Kyrgyz Integrated Household Surveys, the study assesses the prevalence and persistence of moderate and severe food insecurity in the country. The first findings indicated that official statistics, which use undernourishment as a proxy for food insecurity, fail to account for self-produced food consumption, which is prevalent in this region. As a result, relying solely on conventional statistics can lead to an overestimation of the problem of food insecurity. The research also explored demographic and socio-economic factors, such as region, gender, education, and remittances, to assess their impact on food security. The presentation concluded that a multi-

dimensional approach – including improved monitoring systems and targeted policy interventions – is essential to effectively address chronic food insecurity and enhance household resilience in Kyrgyzstan.

The second speaker of the panel was **Dr. Nurbek Madmarov, Assistant Professor at the American University of Central Asia**, who explored the topic: “How Does Climate Change Affect Agricultural Crop Yields in Central Asia?” Dr. Madmarov’s presentation delved into the effects of climate change and non-climate variables on agricultural crop yields in Central Asia, emphasizing the region's agricultural sector's vulnerability to rising temperatures and extreme weather events. Using crop simulation models, the study examined the nonlinear relationships between crop yields (wheat, potatoes, and cotton) and climate variables such as temperature and precipitation, as well as non-climate variables like agricultural employment and capital stock. The results showed that while agricultural outputs in the region have increased over the past three decades, these gains are uneven and strongly influenced by socioeconomic factors such as land use and agricultural inputs. Key findings included the detrimental effects of rising temperatures on potato and cotton yields and the limited impact of precipitation on overall yields. The presentation ended by emphasizing the importance of targeted climate adaptation strategies, optimizing land use practices, and investing in irrigation and agricultural technology to mitigate the adverse effects of climate change.

The conference concluded with closing remarks from Dr. Dunay, who thanked participants for their valuable contributions and collaborative efforts in tackling key security issues. He highlighted some of the most striking insights from the discussions and emphasized the crucial role of sub-state actors, including civil society, in strengthening security in these areas. Additionally, Dr. Dunay noted that the OSCE Academy would be pleased to explore the possibility of publishing select high-quality papers developed from the conference presentations.