Towards a Central Asia-as-a-Platform Strategy and a Digital Solutions Centre for Sustainable Development

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Foreword

Digital technologies are transforming global economies and societies at unprecedented speed. The COVID-19 pandemic has contributed to the accelerated adoption of digital technologies as governments impose strict measures to control the spread of the virus, and essential services move online. In this new normal, digital transformation is no longer a choice but a necessity.

While the consequences of the COVID-19 pandemic vary within and across countries, a common feature is that digital readiness, broadband connectivity and digital capacity have played key roles in monitoring and containing COVID-19, mitigating the devastating socioeconomic impacts, and preparing for quick recovery. As a result, digital transformation has become a top policy agenda for member States in Asia and the Pacific. This includes not only digital transformation at the national level, but also at the subregional and regional levels through joint actions across countries in leveraging the opportunities and addressing the rising risks of digital technologies, including cybersecurity and data privacy threats. Importantly, regional cooperation is critical in narrowing the digital divide.

In response to this new normal, the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) secretariat is cooperating with member States and subregional working groups in developing the second “Action Plan for Implementation of the Asia-Pacific Information Superhighway (AP-IS Action Plan 2022-2026)”. This action plan will serve as a blueprint for regional cooperative actions that promote connectivity for all, digital transformation and digital data as underlying foundations for an inclusive, sustainable and resilient digital economy and society.

In alignment with the AP-IS, the Regional Economic Cooperation and Integration (RECI) initiative of ESCAP aims to promote seamless connectivity in transport, energy and information and communications technology for market integration. As part of the RECI initiative, ESCAP is implementing the United Nations Development Account Project on “Addressing the Transboundary Dimensions of the 2030 Agenda for Sustainable Development through RECI in Asia and the Pacific” from 2018 to 2021. This project promoted knowledge products such as analysis reports, and build capacity of member States in promoting seamless regional connectivity for inclusive and sustainable digital transformation through whole-of-government and whole-of-society approaches that cut across sectors and nations.

This working paper is an output of this project and aims to facilitate development of a digital transformation strategy for Central Asia. The working paper analyses the global and regional trends, and the digital readiness of six landlocked developing countries – Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan and Uzbekistan – including their digital policies, strategies and initiatives, and proposes coordinated actions for the way forward in the Central Asia subregion.

We are currently at an important juncture as we focus on building forward better and reimagine our future. The pandemic together with the climate crisis and increasing incidences and severity of disasters are pushing more people into poverty, exacerbating inequalities and reversing global progress towards achieving the Sustainable Development Goals. Digital transformation that is inclusive, sustainable and resilient can enable us to emerge from this pandemic more resilient and get back on track to meeting development goals.

We hope this working paper will be instrumental in uniting Central Asia as a platform, and support high-level decision makers develop a joint digital strategy and take actions towards shaping a better future for all.

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Abstract

This working paper aims to facilitate development of a digital strategy in Central Asia on digital connectivity and transformation in the five landlocked Central Asian countries – Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan – and in Mongolia.

The working paper analyses the digital readiness of each country, including the impact of global trends, and the digital policies, strategies and initiatives in place to respond to these trends. The working paper highlights that climate change, and the green and digital (platform and data) revolutions are exposing the vulnerabilities of this group of landlocked developing countries. For example, threats within the water-energy-food nexus are on the rise. However, these global trends are also creating unprecedented opportunities for breakthroughs in regional integration and sustainable development.

This working paper proposes a digital strategy entitled “Central Asia-as-a-Platform Strategy” with a draft title of the vision to develop innovative competitive subregional advantages in the era of digital transformation. It also proposes the establishment of a subregional Digital Solutions Centre for Sustainable Development (DSCSD) in Almaty, Kazakhstan as a digital platform and vehicle implementation of the subregional digital strategy. The DSCSD can play a crucial role in integrating the cooperative actions of United Nations agencies and regional offices, regional and subregional organizations, and member States, and realize the proposed digital strategy.

Implementation will require vision, innovation and regional cooperation from the member States and community leaders for the collective development of new values proposed in the digital strategy. Development partners and businesses that are committed to the Sustainable Development Goals and the United Nations Secretary-General’s Roadmap for Digital Cooperation, are invited to support this endeavour.

Keywords

information communication technologies, digital green economy, water energy food nexus, climate change, statistical data, geospatial, landlocked developing countries, integration, values, society, equity.
Abbreviations and Acronyms

ADB   Asian Development Bank
AI    Artificial Intelligence
AP-IS Asia-Pacific Information Superhighway
CAREC Central Asia Regional Economic Cooperation
CAREC Regional Environmental Center for Central Asia
CASA   Central Asia South Asia
DSCSD Digital Solutions Centre for Sustainable Development
EAEU   Eurasian Economic Union
ECLAC Economic Commission for Latin America and the Caribbean
EGDI   E-Government Development Index
ESCAP Economic and Social Commission for Asia and the Pacific
ESG    Environmental, Social and Governance
FAGAM Facebook, Amazon, Google, Apple and Microsoft
FAO    Food and Agriculture Organization
IDS    Information and Communications Technology and Development Section
ITU    International Telecommunication Union
LLDC   Landlocked Developing Country
RECI   Regional Economic Cooperation and Integration
SDG    Sustainable Development Goal
SPECA United Nations Special Programme for the Economies of Central Asia
UNFCCC United Nations Framework Convention on Climate Change
WSIS   World Summit on the Information Society
Introduction

The analysis, vision and parts of the proposed digital transformation strategy presented in this working paper are based on three global trends—climate change, and the green and digital (platform and data) revolutions.

Globally, digitalization began as the process of leveraging digital technologies and data to improve business processes and models. Digital transformation\(^2\) is the new development paradigm and its processes use disruptive technologies, digital connectivity and networks, including artificial intelligence (AI), the Internet of Things and digital data. This development is for the whole of societal fabric of value creation, with people as a priority, and the processes aim to bring about innovative change—not just to enhance or support “business as usual”.

The world is beginning to view digital transformation from the perspective not only of the economy and business, but also of the social and cultural values that form the basis of an information society.

Disruptive technologies continue to change traditional competitive advantages, business models, development strategies, notions and concepts, through distinct digitalization and digital transformation stages. In this context, Central Asian countries may find themselves largely at the starting stages, with some progressing better than others.

Even before the COVID-19 pandemic, the World Summit on the Information Society (WSIS) was putting human capital and social issues at the centre of digital transformation. If these issues are put forward as the main priorities in Central Asia, then the governments concerned will be considered reformists. Such a step will be consistent with expert opinion that successful transformation always begins with a great vision.

However, as member States of this subregion expressed its ownerships in international relations and cooperation, their vital interest today is digital independence and digital cooperation. They need to maintain digital cooperation and balance among digitally advanced countries, new global digital platform corporation such as FAGAM (Facebook, Amazon, Google, Apple, Microsoft), traditional multinational corporations and other global actors. In this connection, in order for countries in the Central Asia region to gain a competitive digital advantage, they need to increasingly develop and pursue their own regional digital platform strategy.

According to the International Monetary Fund and the World Bank findings, regional cooperation is a key force for coping with the consequences of the pandemic, as well as with global challenges such as climate change to ensure sustainable development. The leaders of the subregion have an opportunity to begin effective digital integration, based on common e-platforms and data sharing, to create a digital economy and society. This innovative approach will help Central Asian countries leapfrog from stagnation to breakthrough in economic, political and sociocultural relations.

In this context, the establishment of a Digital Solutions Centre for Sustainable Development (DSCSD) is proposed. The DSCSD could connect with United Nations agencies, global and regional organizations such as the Asian Development Bank (ADB), and regional platforms and initiatives such as the Asia-Pacific Information Superhighway (AP-IS) for digital connectivity and transformation that contribute to achieving the Sustainable Development Goals (SDGs). Urgent action is required due to climate change—Central Asia is warming faster than the global average.\(^3\)

UN agencies, international financial institutions and other stakeholders are invited to respond to the appeal of the President of Kazakhstan, as Chair of the Group of Landlocked Developing Countries (LLDCs), as follows: “We call on

\(^2\) The definition is taken from a draft working paper of the Information and Communications Technology and Development Section (IDS) of ESCAP. The views expressed through IDS should not be reported as representing the views of ESCAP.

international financial institutions, the United Nations system, and other international and regional organizations to prioritize the special needs of LLDCs in their recovery efforts...to boost resilient infrastructure, trade facilitation mechanisms, and digital transformation”.

This working paper is supported by a project entitled, “Addressing the Transboundary Dimensions of the 2030 Agenda through Regional Economic Cooperation and Integration (RECI) in Asia and the Pacific”, from 2018 to 2021. The RECI outcomes are reflected in the Bishkek Declaration on “Strengthening Regional Cooperation to Support Socioeconomic Recovery in the Wake of COVID-19” 4 on 20 November 2020. The Memorandum of Agreement between the Ministry of Digital Development, Innovations and Aerospace Industry of Kazakhstan and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) signed on 20 April 2021 is currently guiding implementation.

Scope and Structure of the Working Paper

The objective of the working paper is to assess the digital readiness of five landlocked Central Asian countries – Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan – and Mongolia. It includes an assessment and analysis of current national policies, regulations, strategies and flagship initiatives, and institutional capacities for digital transformation. Based on the analysis, a strategy with policy recommendations for promoting digital connectivity, infrastructure development and transformation in Central Asia is detailed.

Section 1 explores key global and regional trends, and factors and implications to be considered in analysing the development of Central Asian institutions and their digital transformation. Section 2 covers national and subregional programmes and initiatives on digital connectivity, developing the information and communications technology (ICT) infrastructure and digital transformation to better understand Central Asian countries’ plans, efforts and potential for subregional digital cooperation. Section 3 presents a rationale for the Central Asia-as-a-Platform Strategy to ensure subregional competitive advantage. It provides justification for the special role of the DSCSD as a tool of the strategy. It also provides high-level policymakers with quick solutions by using big data analytics, modelling, prognosis and research on digital transformation, in particular on green and digital transformation issues. The working paper concludes with concrete cooperative actions for the way forward.

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Box 1: Guiding United Nations Documents and Resolutions on Digital Development

- An In-depth Study of Broadband Infrastructure in North and Central Asia (2014)
- Bishkek Declaration on Strengthening Regional Cooperation to Support Socioeconomic Recovery in the Wake of COVID-19 (2020)
- Addressing the Transboundary Dimensions of the 2030 Agenda through RECI in Asia and the Pacific (2018-2021)
- The Digital Economy as an Accelerator of Regional Integration in Asia-Pacific (2012)
- The SPECA Innovation Strategy for Sustainable Development (2020)
- Big Data for Environment and Agriculture Statistics (2021)
- ESCAP resolution 73/6 on Implementation of the Asia-Pacific Information Superhighway Initiative through Regional Cooperation (2017)
- ESCAP resolution 75/7 on Advancing the Implementation of the Asia-Pacific Information Superhighway Initiative through Regional Cooperation (2019)
- ESCAP Committee on ICT, and Science, Technology and Innovation, Third Session, Report (2020)
1. Context and Rationale

This section covers the context and rationale for the development of the Central Asian Digital Strategy by examining global factors and trends. Aspects and values of decentralization, and the role of the platform-based economy are explored, as well as their subregional implications. The section ends with a summary of key highlights and recommendations.

1.1. Global Factors and Trends

Finance-based globalization is being replaced by information- and digital-based globalization. The COVID-19 pandemic has had devastating effects on people’s lives, especially in low- and middle-income countries. According to the United Nations, the five landlocked developing Central Asian countries – Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan – and Mongolia are particularly vulnerable. Their citizens are demanding that their governments implement new reforms to provide accessible services by using modern technologies, including e-government, e-healthcare and e-education.

This trend is amplified by the effects of climate change that is increasingly impacting people’s health and well-being. Some solutions may come from the new mechanism of the United Nations Framework Convention on Climate Change (UNFCCC) that combines penalties and compensations for governments according to their level of carbon dioxide emissions, to be endorsed at the 2021 United Nations Climate Change Conference (COP26) in November 2021.

However, disruptive technologies, exponential growth of data and AI are creating a conflict between data for profit and data for the common good. The tougher and more competitive the technological race is, the more important a human-centred approach and human capital will be.

The United Nations Secretary-General’s Roadmap for Digital Cooperation, and other United Nations documents and resolutions (see Box 1) stress multi-stakeholder roles in the digital era to reinvigorate global connectivity, a more equitable world, inclusion for all, global cooperation, capacity building, protection of human rights, trust and security. There is a proliferation of knowledge platforms, such as the Green Policy Platform, Green Industry Platform and Green Finance Platform of the Green Growth Knowledge Partnership. These platforms are creating a virtual place for communities to interact and exchange information, goods and services.

Decentralized Economies and Societies: New Pathways for Creating Value

Technologies are becoming more accessible to all due to shared networking and improved communications. Underpinned by blockchain, digital technologies will not only impact how we trade but will also radically change how we make, design and produce physical and digital goods. This refers, for example, to cultural and creative industries – a crossroad of arts, technology, business and entertainment. One of the fastest growing industries in the United Kingdom is the creative industry that contributed GBP115.9 billion to the economy in 2019, a 43.6 per cent increase since 2010. Similar dynamics can be observed in countries of Central Asia, where the creative economy is also the most promising and fastest growing segment. The creative economy and the platform economy are converging, and the resulting impact is difficult to forecast.5

As the world becomes more interconnected, the power is shifted out of the hands of traditional governments and institutions to non-state actors and civil society. Co-governance becomes a new relation between government institutions, decision makers, non-governmental organizations and citizens. Therefore, not only new economic values, but also social values such as justice and solidarity, emerge and are restored. The process is stimulated by unprecedented enhancement of transparency due to “technologies for integrity”, such as blockchain, big data analytics, AI and e-governance – the same technologies that are

also considered disruptive.

An example is Switzerland that is currently building a universal transaction platform for a prosperous and sustainable society for everyone. The project has been inspired by the technologies of Johann Gevers founder of the world’s leading cryptofinance ecosystem Crypto Valley as well as Monetas Tezos Foundation, Digital Finance Compliance Association and Bitcoin Association.

1.2. Subregional Implications

The COVID-19 pandemic has brought setback in development achieved in Central Asia, and highlighted ongoing governance and structural problems. Moreover, the wages, pensions and other social benefits in Central Asian countries are comparatively low. The sense of social unfairness stemming from persistent inequality also has economic consequences.

However, change for the better are emerging. With new economic and policy developments in Kazakhstan and Uzbekistan, a new form of interaction – the Presidential Consultative Meeting of the Five Central Asian States – have gained momentum. Between 2017 and 2018, Uzbekistan’s imports from Kazakhstan increased by USD 569 million, or over 53 per cent, and a similar trend can be observed in their bilateral trade with other neighbours. The third meeting was held on 31 March 2021. Yet, certain obstacles to integration remain to be resolved.

Countries in the subregion underestimate the importance of building subregional institutions and governance. This is one of manifestations of the paradox: Central Asia, despite being the most remote subregion from the seas, is one of the most disconnected in terms of inter-country relations. The below illustrates the perspective on the root of the problem of disintegration in the subregion.

Historically economic and, most importantly, social and cultural values and connections of the vibrant community were broken. Not only many people and the values were lost, but brotherly ethnic and religious groups were artificially separated mentally by massive destruction and falsification of a common history and heritage. Civilizational achievements, technologies and innovations, including spiritual ones, derived from the symbiosis of semi-nomadic and sedentary cultures, have been erased from the memory of even contemporaries, descendants of the Turkic people, let alone outsiders. A large part of the material and intangible heritage disappeared. The spiritual values were replaced by a hybrid of ideologies - from the remnants of surrogates of communism and an unprecedentedly unjust and similarly totalitarian neoliberalism.

Now it is only logical that societies do not accept the poor governance and corruption on all levels that this hybrid brings them. On the other hand, the digital technologies of ‘honesty and justice’ and creative industries noted in the previous Section, can help restore almost lost heritage. The latter includes the best ancestors traditions, as well as social cohesion. The fusion of digital technologies and the creative industries can enable the creation of a new culture and enhance the uniqueness of Central Asia’s identity.

Such expectations and positive developments are largely linked to the political will of the leadership in Kazakhstan, Kyrgyzstan and Uzbekistan to engage in the green and digital revolutions. For example, in Soviet times, regional cooperative mechanism between water-abundant upstream countries and downstream countries for saving, managing and using water resource for irrigation in summer and for energy in winter seasons. However environmental aspects of natural resources management were not properly addressed. The desiccation of the Aral Sea is the most widely known example of the consequences of disregarding environmental impacts.

After independence in 1991, the formerly regional cooperative mechanism on water and energy resource management was replaced with national approach. This led to fragmentation of supply networks and conflicts mainly between upstream and downstream neighbors (refer to Annex 3).

In spite of the climate crisis, solutions along the water-energy-food security nexus may build a new reality. The same transboundary and cross-border challenges that have been a source of discord between countries for years
can become integration drivers. On 31 March 2021, H. E. Kassym-Jomart Tokayev, President of Kazakhstan addressed the Cooperation Council of Turkic-speaking States, stating: “The water and energy sphere is an integral part of the relations of Turkic-speaking countries. Efficient and equitable use of transboundary water resources is the key to the stability and prosperity of the region”. He also expressed his readiness to implement projects with neighbouring countries to build hydroelectric facilities, and implement joint projects in areas like AI, big data analytics, digitalization and Internet trade.

In December 2020, at the United Nations Summit on Climate Ambitions, the Head of Kazakhstan announced his country’s goal to achieve carbon neutrality by 2060: “We are making consistent efforts to increase the share of renewable energy sources in total energy production. As of 2020, this figure was three per cent, but in 2022 we plan to double this figure, and by 2030, the share of green energy will be increased to 15 per cent”. The Green Kazakhstan Project plans to achieve the SDGs, including affordable and clean energy, sustainable cities and communities, as well as responsible consumption and production. Towards achieving these SDGs, a new Environmental Code was adopted, which complies with the principles and standards of the Organisation for Economic Co-operation and Development (OECD), and entered into force on 1 July 2021. Public and private investments in green economy development are increasing, including in renewable energy, efficient water use and rational use of other natural resources.

President Kassym-Jomart Tokayev of Kazakhstan made it clear that the main goal of all reforms is to build an economically strong and democratically developed “listening state”, focused on meeting the needs of every citizen. This should lead to a state in which people’s voices are responded to by the authorities and human rights are protected.

The President of Kazakhstan stated: “A truly diversified, technological economy ... must work to improve the well-being of the people. We must find a positive answer to the growing public demand for a fairer distribution of benefits arising from the growth of national income...”. Referring to the draft Law on Public Control (2021), the President of Kazakhstan stated: “We need to create a single legitimate institution of online petitions for citizens to initiate reforms and proposals. Such a mechanism must be completely protected from any manipulation”.

Similarly, H.E. Shavkat Mirziyoyev, the President of Uzbekistan continues to make the government more accountable to the electorate. “Virtual reception rooms” have become one of the main mechanisms of dialogue between citizens and the president, and all government agencies have their own virtual reception room portals. The draft Law on Public Control (2018) and the President of Uzbekistan Decree to cut red tape (2021) are aimed at fundamentally changing how the government interacts with citizens.

In Mongolia, the government launched a platform available both online and through a smartphone app called e-Mongolia, which gives citizens access to the 181 most in-demand government services. These developments are largely based on the advantages of the platform and data revolution.

### 1.3. Strategy and Tools

It is proposed that an innovative competitive subregional advantage – Central Asia-as-a-Platform Strategy – be developed. This Central Asia-as-a-Platform Strategy would require vision and inspiration from state and community leaders, especially for the collective development of new values for the information society. Central Asian leaders, empowered by digital technologies, have an opportunity to apply global best practice, innovative ecosystems and a new culture. This could bring about radical modernization of the mindset of officials and citizens – a major transformative force. It could turn transboundary challenges such as water-energy-food insecurities and climate change into a breakthrough in integration and sustainable development. Development partners and businesses that share environmental, social and governance (ESG) principles, as well as the goals of the United Nations Secretary-General’s Roadmap

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6 State of the Nation Address, 1 September 2020.
7 Note by author.
for Digital Cooperation, should be interested in supporting this endeavour. The DSCSD is a platform and tool to implement this strategy. More details on the DSCSD are given in Section 3.

Box 2: Key Highlights and Recommendations

- Global trends should stimulate Central Asian and Mongolian governments to develop and strengthen digital-green policies.

- New strategies and approaches are needed to address competing goals in the subregion, such as fostering new growth engines, green energy, AI, e-commerce and digital finance. Examples include the European Union “high-quality building of the Belt and Road” and “connectivity priority”, and the EAEU “Digital Agenda of the Eurasian Economic Union”. Through new strategies and approaches, power centres could be encouraged to cooperate instead of compete, and mutually ensure a "balance of interests" in the subregion. The experience of Kazakhstan and its neighbours in securing a balance in pipeline and transit transport policies in Central Asia is a good example.

- Radically transforming social norms with frontier “technologies of integrity” could create new economic opportunities and renew citizens’ trust in governments. There is a need to understand data-driven governance – the intensive and extensive use of data to allow citizens to organize, define and achieve their common future.

- A vision is needed to address transboundary challenges and transform discord between countries to drivers of Central Asian integration. This includes leveraging practical digital solutions and adopting a nexus approach for improved outcomes in integrated management of resources. For example, water-energy and e-agriculture digital platforms could be established as building blocks for subregional digital integration (see Annexes 2 and 3).

- Since true integration is based on shared values, and culture is the fundamental bond of communities, binding us together when pursuing shared objectives, it is important to consider the cultural aspects, an equal footing with the business and economic aspects of digital transformation to restore cooperative values in the subregion. Therefore, it is vital to create a common sociocultural digital platform along with the water-energy and e-agriculture digital platforms proposed above, with a view to developing social integration and creative industries.

- To cope with the challenges of the 21st century, Central Asian governments should make subregional digital integration an explicit national policy priority.

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This section provides a brief overview of national and subregional digital readiness and offers key highlights and recommendations.

2.1. National Level

Key programmes and initiatives in digital connectivity, infrastructure and transformation of the five Central Asian countries and Mongolia have been developed during the last three years. However, Kazakhstan has advanced in various areas, placing it at second place in the 2020 Government AI Readiness Index for South and Central Asia, out of 16 countries.\(^\text{10}\) Central Asian countries will be able to achieve their stated development goals and commitments by supporting them with systemic measures, investments and joint actions.

1) The Digital Kazakhstan programme was launched in 2018. However, Kazakhstan has been at the regional forefront in rolling out e-government services since 2008. The e-government system provides more than 83 per cent of public services.\(^\text{11}\) Kazakhstan is ranked 29th in the 2020 United Nations E-Government Development Index (EGDI), and ranks highly in the e-participation and open government data indices.\(^\text{12}\) Yet, Digital Kazakhstan does not include strategies and actions for using digital technologies in reducing disaster risks, addressing environmental and climate challenges, and strengthening health systems. Besides Digital Kazakhstan, the national project, DigitEl, is being developed, involving the creation of ten technological platforms: govtech, smart city, Industry 4.0, agritech, blockchain, space-geotech, AI, e-industry, fintech and greentech. These platforms will have a ready-to-go technical infrastructure, host large amounts of open data, and provide developmental and analytical systems for local ICT companies and startups. DigitEl also aims to provide a network of virtual museums, converting to e-format all museum resources and objects of material and intangible heritage. The government is developing a new concept for creative industry growth in 2021.

2) Kyrgyzstan likewise has a Digital Kyrgyzstan transformation programme for 2019-2023, and 2019 was declared the Year of Regional Development and Digitalization of Kyrgyzstan. In 2017, the government adopted the digital transformation programme – Taza Koom – to improve the national digital infrastructure. Kyrgyzstan is one of the top three countries in the world with the less expensive Internet access.\(^\text{13}\) The e-government system – e-Kyzmat – is consistently growing its e-services for the population, with plans to provide 80 per cent of public services electronically by 2023.\(^\text{14}\) Kyrgyzstan ranks 83rd on the EGDI, and ranks highly on the e-participation index, while its open government data score is average.\(^\text{15}\)

3) The Uzbekistan E-Government Development Programme 2013-2020 was completed, and the Digital Uzbekistan 2030 programme is being developed. The President of Uzbekistan declared 2020 as the Year of Science, Enlightenment and Digital Economy Development and outlined the transition to the digital economy for the next five years. As of 2020, 30 per cent of public services are digitalized with plans to digitalize more public services in the near future.


\(^{13}\) Cable.co.uk, "Worldwide mobile data pricing 2021". Available at https://www.cable.co.uk/mobILES/worldwide-data-pricing/.


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The country is 87th on the EGDI. The World Bank’s Digital Central Asia–South Asia (CASA) is a regional programme aimed at improving broadband Internet connectivity and developing an integrated regional digital infrastructure. Within the Digital CASA–Kyrgyzstan project USD50 million was approved in March 2018. The Digital CASA–Uzbekistan project has an estimated budget of USD300 million. The Digital CASA projects in Kazakhstan and Tajikistan are currently being developed.

4) Tajikistan’s Concept for the Formation of Electronic Government 2012-2020 was adopted in 2011. It divided implementation into three stages, but it is far behind schedule in providing e-government services. Low access to the Internet due to scarcity of equipment and high costs of connection – including a five per cent tax – plus lack of ICT infrastructure, challenges the realization of the programme. As of 2020, 26 per cent of the population were connected to the Internet. On the EGDI, Tajikistan is ranked 133rd with an average e-participation score and a low open government data score.

5) Turkmenistan launched its Concept of the Development of the Digital Economy until 2025 in 2019 and adopted the Law on Electronic Document Management and Digital Services in March 2020. The government aims to implement an electronic document management system in 2021 and launch an e-government system. However, due to the unsatisfactory level of digital infrastructure development and gaps in connectivity, Internet access remains low. On the EGDI, Turkmenistan is 158th, with low e-participation and open government data scores.

6) The E-Mongolia Platform 2020 is based on the Estonian model of digital transformation. The Government of Mongolia created “Khur” and “Dan” state service systems in the past, which will be transferred to the E-Mongolia Platform.

8) Digital data centres, technology parks, innovations and science centres have been established in Central Asia and Mongolia (see Annex 4).

9) The green-digital agenda in Kazakhstan includes the following:

- The Green Bridge Partnership Programme 2022-2026 that aims to improve access to green technology and investment.
- A new Environmental Code 2021 with a focus on eco-friendly technology in manufacturing and more green projects. Kazakhstan is ranked 33rd in the Green Future Index of the Massachusetts Institute of Technology.
- In 2020, the Astana International Exchange, where Nasdaq and the Shanghai Stock Exchange are shareholders, made its first offering of green finance bonds to help small-and medium-sized businesses invest in renewable energy projects.
- The Astana International Financial Centre’s Green Finance Centre was created in 2018 to develop and promote green finance in Kazakhstan and the Central Asia subregion.
2.2. Subregional Level

The list below highlights key strategies, programmes and initiatives related to digital connectivity, infrastructure and transformation in the subregion. Box 4 covers good practices and strategies from the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) that are relevant to developing the Central Asian Digital Strategy.

1) The AP-IS Action Plan (2022-2026) is comprised of three pillars:

- Connectivity for all, focused on infrastructure and connectivity.
- Digital technology and applications, focused on digital platforms, technologies and applications.
- Digital data, focused on creating, collecting, integrating, managing and using data, including big data, for developing data-driven policies and solutions to development challenges.

The governments of the subregion are not only fully aware of these priorities, but also implement and fund several relevant projects to improve the digital infrastructure and connectivity. For example, the TransCaspian fibre-optic project launched in November 2019 and costing USD60 million aims to construct a fibre-optic cable line along the bottom of the Caspian Sea between Azerbaijan and Kazakhstan. Its data transfer capacity is estimated at six terabits per second. A team of British investors suggested that the project be extended to two data centres in the cities of Aktau and Baku on either side of the Caspian Sea as part of the Caspian Digital Hub Kazakh-Azerbaijani project. The links are Frankfurt–Azerbaijan–Kazakhstan–China; Frankfurt–Azerbaijan–Turkmenistan–Iran; and Azerbaijan–Turkmenistan–Uzbekistan–Afghanistan–Pakistan–India. The above links also open opportunities for Mongolia.

2) The World Bank Digital CASA, a regional programme, intends to increase access to more affordable Internet, promote private investment in ICT, and improve capacity to deliver digital government services in Central Asia and parts of South Asia. This will be done through the development of a regionally integrated digital infrastructure and an enabling environment. The World Bank has invested USD300 million in this project.

3) The Digital Almaty Forum 2021 provides a regional and global platform to discuss the digital agenda in the context of COVID-19, including new digital transformation strategies, trends in emerging technologies during the pandemic and prospects for international cooperation.

4) The European Union’s new Central Asia strategy of 2019 is focused on connectivity, and is a response to China’s Belt and Road Initiative.

5) The EAEU Digital Agenda until 2025 aims to create a single digital economy among EAEU member States. As Kazakhstan and Kyrgyzstan are members of the EAEU, these countries will need to identify and assess the synergies and contradictions between the EAEU Digital Agenda and the priorities of the Central Asian integration and digital transformation.

6) In the Central Asia Investment Partnership, the International Financial Centre, United States of America, Kazakhstan and Uzbekistan will jointly raise at least USD1 billion to support economic growth in Central Asia, increasing trade, development and connectivity.

7) ESCAP supports the implementation of the Vienna Programme of Action for Landlocked Developing Countries, focusing on the following priority areas:

   a. Fundamental transit policy issues
   b. Infrastructure development and maintenance
   c. Transport, energy and ICT infrastructure
   d. International trade and trade facilitation
   e. Regional integration and cooperation
   f. Structural economic transformation
   g. Means of implementation

8) The 2019 Digital Transformation in Central Asia Conference organized by the University of Central Asia, the State Committee for ICT and the High Technology Park of Kyrgyzstan was the first of its kind in the region. A strategic partnership was set up to support innovative ecosystems in the region between the High Technology Park and Shenzhen Open Innovation Lab. Selected startups will be able to leverage
resources from, and connect to, startup ecosystems in China. Technology parks can then be replicated, and further partnerships explored. Also of particular interest is the presentation by Dr. Hak-Min Kim, Professor of Public Administration at Soonchunhyang University of Korea, on smart city and science and technology park as regional innovation platform.

Box 3: International Telecommunication Union Commitments towards Supporting Landlocked Developing Countries

The International Telecommunication Union (ITU) has committed to meeting the needs of LLDCs, which include the five Central Asian countries – Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan – and Mongolia. This involves incorporating the needs of LLDCs in ITU activities, programmes and projects to achieve commitments made under the Vienna Programme of Action, which was agreed by the United Nations General Assembly during the Second United Nations Conference on the LLDCs in November 2014. The main objective of this 10-year action plan (2014-2024) is to accelerate progress in achieving sustainable development in the LLDCs. Digital technologies play a critical role in achieving this objective.

ITU’s mandate is to connect the unconnected and help the most vulnerable countries leverage digital technologies for sustainable development. In terms of the telecommunications infrastructure, LLDCs depend on neighbouring and coastal countries for access to undersea cables and international Internet bandwidth. Often, costs for ICTs in LLDCs are relatively high. ITU has maintained a dedicated programme for LLDCs since 2003, and adopted special resolutions for the LLDCs to support their ICT developments and address their specific challenges.

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Box 4: The Plan of Action for the Information Society and the Regional Broadband Dialogue in Latin America and the Caribbean

The Plan of Action for the Information Society in Latin America and the Caribbean presents a good case study for developing a regional digital framework and managing relationships with external players. It has been recognized as the standard-setter for national ICT policies in the region and as a platform for political dialogue and cooperation between the region’s countries, and also between the region and Europe. Since its inception in 2005, it has brought together political authorities and leading actors from the telecommunications and ICT industry and academia, representatives of international organizations and civil society, as well as institutions specializing in many digital development initiatives. The process is supported by a technical secretariat operated by ECLAC. The Plan of Action has been updated on three occasions in light of technological advances and changing country and regional needs, with adjusted goals and targets that were approved at ministerial conferences.

The Regional Broadband Dialogue, created in 2010, is a forum for debate and sharing of experiences, approaches and proposals among ECLAC member States, and has been instrumental in improving access, affordability and quality of broadband connectivity in Latin America and the Caribbean. The Regional Broadband Dialogue brings together 11 countries of the region – Argentina, Brazil, Bolivia, Chile, Colombia, Costa Rica, Ecuador, Mexico, Paraguay, Peru and Uruguay. ECLAC acts as the technical secretariat. At the request of member States, the Regional Broadband Observatory was established in May 2011 to provide relevant and timely information that helps the region’s countries develop and follow up on public policies for the universalization of broadband. The activities of the Regional Broadband Observatory consist of preparing service indicators; compiling, systematizing and disseminating information on policies for large-scale roll-out; and preparing periodic reports on broadband in the region.
Box 5: Key Highlights and Recommendations

- Technology is a tool for digital transformation, while people and society should be at the heart of this process.
- The AP-IS Action Plan (2022-2026) could provide a bridge between the forthcoming Central Asia Regional Economic Cooperation (CAREC) Digital Strategy 2030 and digitally-advanced countries in other subregions of the Asia-Pacific, since the AP-IS Action Plan covers all Asia-Pacific member States and subregions.
- The bridging role of the AP-IS Action Plan (2022-2026) could appeal to member States of Central Asia concerning potential benefits such as the transfer of digital technologies, sharing of good policies and governance systems, the balance of digital powers among digitally-advanced countries, and expansion of digital markets. Central Asian countries are therefore more likely to accept the CAREC Digital Strategy 2030.
- The TransCaspian fibre-optic communication line would secure for Central Asian countries a data transmission infrastructure and access to leading Europe-Asia trunk routes, as well as a more certain role in world data transit. For example, Kazakhstan expects data transit revenue to reach USD300 million.
- The branch projects of the TransCaspian link, along with the potential involvement of some big tech companies in establishing and operating the Caspian hub, could become a gamechanger for the entire subregion, having positive implications for the AP-IS in the context of its three pillars.
- With the support of the World Bank, Central Asian countries aspire to advance their connectivity capacity to promote subregional digital connectivity.
- Based on the Digital Almaty Forum, an Information Society Platform for political dialogue and cooperation could be created for discussing and coordinating digital policies, as well as managing relationships with external players.
- A forum, similar to that of ECLAC’s Regional Broadband Dialogue, renamed as Regional Digital Dialogue, could be created for debate and sharing of experiences, approaches, specific technical issues and proposals for increasing access, affordability and quality of Central Asia’s digital infrastructure.
- The status and capacity of the Digital Transformation Officer in Kazakhstan and Uzbekistan should be enhanced, if required, and the same position created in other Central Asian countries to connect officers in a common mechanism to ensure their effective interaction in the AP-IS, Information Society Platform and Regional Digital Dialogue.
- CAREC is expanding cooperation into new areas, such as agriculture, water and ICT, and prioritizing data research and data management, among other digital skills. The ADB is the secretariat of the CAREC programme.
- Recommendations from the Third CAREC Think Tanks Development Forum in 2018 indicate that the future for the subregion’s landlocked countries is in the service industries and fintech, and subsequently a wide range of multilateral institutions have shown interest in these areas.
- Central Asia should make sustainability a key feature in all its projects. CAREC could be a coordinator to set common ESG benchmarks for the subregion. In addition, steps are needed to foster creativity, entrepreneurship and innovation in the subregion.
- The bankability of projects should be enhanced, involving multilaterals either as co-financers (lender or guarantor) or technical advisors.
- CAREC should look at innovative models and mechanisms of finance. A regional or CAREC Fintech Infrastructure Fund could be a model to leverage a regional fintech revolution. CAREC should promote the Central Asian Fintech Investment Opportunity through presentations and roadshows across the globe with support from the European Institute for Asian Studies.

This section highlights the potential of the subregion’s innovative competitive advantage – the Central Asia-as-a-Platform Strategy. The digital transformation and integration of national digital platforms of Central Asian countries for subregional economic, political and sociocultural service delivery may be a once-in-a-lifetime opportunity. Such integration, enabled by the big data revolution and the platform economy, could contribute to achieving the SDGs and strengthening the competitiveness of countries.

Similar to business concepts of value creation for new products or enhancing existing brands, there must be the collective creation of new values for the information society of Central Asia, based on best national traditions and modernized common identity nurtured with the green-digital culture. The essential condition for such a transformation would be the existence of confidence and transparency.

There would need to be confidence-building measures such as successful implementation of subregional cross-sectoral pilot projects with digital components and with international partners (see Annex 5). This must be combined with scaling up and integrating projects on digital platforms in priority areas. First, the water-energy-food nexus and climate change issues would need to be addressed. Breakthrough in these areas would increase investment attractiveness and ensure competitive subregional advantage. It may also stimulate external actors to opt for pragmatic cooperation. Moreover, subregional digital integration could make real what local peoples dream of – the highest level of interaction, a common economic space, and revival of a unique identity for Central Asia.

Development partners, including international financial institutions and businesses that share ESG principles should be interested in supporting this endeavour.

3.1. SPECA: A Subregional Platform to Support SDG Implementation

In 2015, after adoption of the 2030 Agenda for Sustainable Development, the United Nations Special Programme for the Economies of Central Asia (SPECA) Governing Council decided that the programme would become a platform for subregional cooperation to implement the SDGs. In 2016, the six SPECA working groups mapped the interventions, priorities and needs of SPECA’s participating countries against the SDGs.

The SPECA Working Group on Knowledge-based Development (former Working Group on Innovation and Technology for Sustainable Development) serves as a practical instrument to implement the 2020 SPECA Innovation Strategy for Sustainable Development. Among other functions, the working group serves as a forum for discussion on issues related to knowledge-based development, including ICT and related policy and regulatory issues.26

3.2. The Role of the DSCSD

DSC SD is expected to play two key roles. The first role is an accelerator. DSC accelerates the national vision such as Green Digital Transformation towards an Inclusive Digital Society in the North and Central Asia region. The second role is a coordinator. The DSC strengthens coordination and partnerships among multi-stakeholders such as member

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States, UN agencies, regional organizations and national research organizations to move together towards an inclusive digital economy and society.

The proposed DSCSD is planned to connect with the AP-IS in the mid-term. It should connect with United Nations agencies, global and regional organizations such as the ADB, and regional platforms and initiatives such as the AP-IS for digital connectivity and synergy. It should integrate the data, geospatial information and analytics of the United Nations agencies in Almaty and other parts of the Central Asian subregion, regional organizations, and member States, through the united digital platform. If designed well, with an innovative approach and political commitment, DSCSD could be a digital platform strong tool to strengthen digital-green policies, and contribute to integrated national and subregional policy formulation and implementation.

The main factors defining the DSCSD’s special role and areas of application compared with other innovation and technology centres include the following:

- The data market is dominated by centres specializing in data mining or purely economic matters. The DSCSD intends to focus holistically on economic, social and environmental matters that contribute to achieving the SDGs.

- There is a significant amount of big data produced around ESG issues, but they are of less interest to certain business-oriented groups. Conversely, the international community tend to view ESG principles as central to digital transformation. International companies are also increasingly taking into account ESG criteria in their investment strategies.

- While the AP-IS is aimed at creating an efficient physical and virtual network in the Asia-Pacific region, the DSCSD would cover transboundary and cross-sectoral challenges with a special focus on achieving the SDGs in the Central Asia subregion. One of the key barriers to integration has been trust between upstream and downstream countries. There is a great need for modelling of processes and monitoring in the upper watersheds. Governments need guidance to use scientific knowledge, and good and best practices accumulated within the United Nations system.

- Several bilateral and multilateral programmes and projects in Central Asia supported by international financial institutions and other stakeholders have been successfully implemented. Therefore, there is some optimism that countries in the subregion would welcome data monitoring, collection, processing and analysis. The intention is to create an “honest broker” – a partnership of United Nations agencies on the DSCSD/SPECA platform equipped with “technologies of trust” – the very asset currently missing in Central Asia (see Annex 6).

Engagement with external partners outside of the Central Asia subregion could be through a common GIS platform on which stakeholders would agree on a data sharing framework, analytics methods, forecasting models and solutions options. The exchange would be in two directions – from the United Nations regional offices or headquarters to high-level government decision makers and vice versa. The exchange could be proactive and based on demands from stakeholders.

The internal operating mechanism among Central Asian countries would be between the main national data centres, national statistics organizations and/or the digital platforms of relevant ministries. The DSCSD would collect and collate data and information from national entities, process and analyse data for policymaking and innovative solutions to SDG challenges, and selectively share it on the GIS platform.

It is possible that big tech companies would be interested in getting involved in establishing and partnering with the DSCSD. For example, Oracle, IBM, CISCO, Microsoft, Samsung, LG and others operating in Kazakhstan and neighbouring countries. National companies may also be interested, in particular, KaspiBank with its potential expansion plans in Central Asia.
3.3. Proposed Actions for the Way Forward

A Central Asian Digital Strategy owned by SPECA countries could be a powerful engine for driving a more sustainable, inclusive and resilient subregion. The cross-cutting and interdisciplinary nexus approach towards Central Asia-as-a-platform would need to rely on a holistic collective visioning exercise to drive and motivate innovation and talent.

It is foreseeable that in the near future, participating countries of SPECA would create new enabling policies and innovative solutions to reform business-as-usual in the new normal. Their decisions and systems in the digital economy would need to be established with the support of telecommunications and technologies to create healthy and sustainable patterns of digitalization in industries and all sectors of the economy.

To ensure the success of the Central Asian Digital Strategy, the governments of Central Asia are required to cooperate to develop detailed action plans for achieving the strategy, with the special focus on establishing the DSCSD as an implementing digital platform. In addition, it is important to suggest to the President of Kazakhstan, Chair of the Group of LLDCs, to announce and garner support for these initiatives. This could be done following consultations with the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States. The following detailed actions are proposed for policymakers:

1) Create detailed actionable plans for initiating the Information Society Platform and Regional Digital Dialogue by using the SPECA, Digital Almaty Forum or ECLAC frameworks. These frameworks could be a part of or aligned with the strategy for DSCSD –
   b. Request ESCAP to provide continued support to the development and implementation of the Central Asian Digital Strategy with a focus on the establishment of the DSCSD, Information Society Platform and Regional Digital Dialogue.
   c. Submit these initiatives for consideration at the 2021 or 2022 SPECA Governing Council meeting.

2) Organize trainings for the officials of Central Asian countries on data-driven governance. The APCICT Virtual Academy, an online distance learning platform could be used for training. This platform is developed by the Asian and Pacific Training Centre for ICT for Development, a regional institute of ESCAP.

3) Strengthen the capacity of Digital Transformation Officers in Kazakhstan and Uzbekistan, if required, and create these government positions in other Central Asian countries to connect officers in a common mechanism to ensure their effective interactions in the AP-IS, Information Society Platform and Regional Digital Dialogue.

4) Leverage the AP-IS Action Plan (2022-2026) –
   a. Explore options and opportunities to seek support under the three pillars of the AP-IS (Connectivity for All, Digital Transformation and Digital Data), including support for joint research, data management and digital skill training (e.g., APCICT Virtual Academy).
   b. Link the DSCSD as a subregional service node of the AP-IS in Central Asia for connection and synergy with countries in other subregions.
   c. Study the best practices of Central Asia and other subregions on digital transformation strategies.
   d. Tap AP-IS knowledge and technical resources to create common digital platforms in Central Asia.

5) Conduct subregional consultations on issues of mutual interests (e.g., regulatory frameworks, TransCaspian link, Caspian Hub, data-driven governance). Share good and best practices on digital-green policies.

6) Discuss at the expert level the technical and organizational issues and possibilities of creating Central Asia-as-a-platform strategy, including with ministries in charge of foreign affairs, ICT, agriculture, energy, environment, finance, planning and urban development, as well as with international experts. The details are as below.
a. Environmental, water-energy and e-agriculture digital platforms
b. Sociocultural digital platform (building upon the Forum of Cultural Dialogue created by third Consultative Meeting of the heads of the Central Asian countries and the creative industries).

7) Cooperate with the Nexus Resource Platform to create green-digital platforms for the subregion. The Nexus Resource Platform is the global knowledge platform for managing and sharing resources on the water-energy-food security nexus, which is implementing a Nexus Regional Dialogue Programme that includes Central Asia. Kazakhstan’s greentech and agritech platforms could be part of the proposed green-digital platforms.

8) Strengthen cooperation with ESCAP and ADB/CAREC to develop the Central Asian Digital Strategy and the DSCSD.

9) Establish partnerships with ADB/CAREC, the Regional Environmental Centre for Central Asia, relevant United Nations agencies (e.g., ESCAP, Food and Agriculture Organization (FAO), International Labour Organization, ITU, United Nations Educational, Scientific and Cultural Organization, UNFCCC, World Meteorological Organization) and world-class companies committed to ESG principles in their investment strategies.

10) Strengthen mutual trust among Central Asian countries by promoting intersectoral and multi-level digital collaborations through development and funding of projects in priority areas. Reach agreement on these projects within the SPECA Working Group on Knowledge-based Development –

a. Align planned DSCSD with the Central Asian Climate Information Platform of the Regional Environmental Centre for Central Asia.

b. Promote innovative initiatives to develop in upstream countries (Tajikistan, Kyrgyzstan), such as managing renewable (wind) energy capacities with advanced digital technologies, including Internet of energy or smart grid, to optimize the efficiency of the energy infrastructure, and reduce water and energy wastage. Pilot projects to increase use of renewable energy and Internet of energy are being developed separately with experts from the United Nations Economic Commission for Europe.

c. Identify appropriate pilot projects in organic agriculture, and the extension of wholesale distribution and agro-logistics centres. Leverage the Central Asia International Centre for Trade and Economic Cooperation that is being constructed at the Kazakh-Uzbek border.

11) Conduct expert consultations on:

a. The external and internal operating mechanisms of the DSCSD-GIS platform.

b. The integration of big data and small data of traditional national statistics organization as there are both opportunities and potential risks of strategic and operational character. Close collaboration between the national statistics organizations, mapping agencies, space agencies and specialized environment agencies could help address the many challenges and risks related to data. International development partners, such as ADB and ESCAP, as well as the specialized funds and programmes of the United Nations that are custodians of environment-related SDG indicators (such as FAO) are supporting the national statistical systems in the use of Earth observation data for environment and agriculture statistics through pilots, trainings and technical guidelines.

12) Submit the Central Asian Digital Strategy, including proposal for establishing the DSCSD to the 2021 SPECA Economic Forum and Governing Council.

13) Implement recommendations of the Third CAREC Think Tanks Development Forum related to developing the service industries and fintech –

a. Make sustainability a key feature in all projects, and at the same time, foster creativity, entrepreneurship and innovation.

b. Enhance the bankability of projects, and involve multilateral organizations either as co-financiers (lender or guarantor), or technical advisors.

c. Cooperate with CAREC to look at innovative models and mechanisms of finance. A regional or CAREC Fintech Infrastructure Fund could be a model to leverage a regional fintech revolution. CAREC could promote the Central Asian
Fintech Investment Opportunity through presentations and roadshows across the globe with support from the European Institute for Asian Studies.

14) Present the above-mentioned initiatives at the Ministerial Conference on Green Digital Forum 2022 in Almaty, Kazakhstan.

15) Arrange bilateral and multilateral expert meetings to discuss technical, institutional and other aspects related to the Central Asian Digital Strategy.
References


### Annex 1: Selected International, Regional and National Organizations related to Green-Digital Transformation

<table>
<thead>
<tr>
<th>United Nations Agencies</th>
<th>Description</th>
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<tbody>
<tr>
<td>United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)</td>
<td>ESCAP promotes cooperation among its 53 member States and 9 associate members in pursuit of solutions to sustainable development challenges.</td>
</tr>
<tr>
<td>United Nations Asian and Pacific Centre for Information and Communication Technology for Development (APCICT)</td>
<td>APCICT aims to build and strengthen the capacity of members and associate members of ESCAP to leverage digital technologies for socioeconomic development.</td>
</tr>
<tr>
<td>Food and Agriculture Organization (FAO)</td>
<td>FAO aims to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives.</td>
</tr>
<tr>
<td>United Nations Astana Civil Service Hub</td>
<td>The hub is inspired by the Agency of Civil Service Affairs of Kazakhstan and established jointly with the United Nations Development Programme.</td>
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<tr>
<td>United Nations Development Programme (UNDP)</td>
<td>UNDP is a cross-cutting agency for sustainable development.</td>
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<tr>
<td>United Nations Economic and Social Council (ECOSOC)</td>
<td>ECOSOC is focused on cross-cutting development issues, especially related to environmental, social and governance issues and the Sustainable Development Goals. Kazakhstan has been elected to the ECOSOC for 2022-2024.</td>
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<tr>
<td>United Nations Economic Commission for Europe (UNECE)</td>
<td>UNECE aims to promote pan-European economic integration.</td>
</tr>
<tr>
<td>United Nations Environment Programme (UNEP)</td>
<td>UNEP sets the environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system and serves as an authoritative advocate for the global environment.</td>
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<tr>
<td>United Nations Framework Convention on Climate Change (UNFCCC)</td>
<td>UNFCCC’s Intergovernmental Panel on Climate Change conducts worldwide climate change research and provides an authoritative source of reference based on multiple international datasets.</td>
</tr>
<tr>
<td>United Nations Initiative on Global Geospatial Information Management (UN-GGIM)</td>
<td>UN-GGIM aims to address global challenges regarding the use of geospatial information, including in the development agendas, and to serve as a body for global policymaking in the field of geospatial information management.</td>
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<tr>
<td>United Nations Office for Disaster Risk Reduction (UNDRR)</td>
<td>UNDRR convenes partners and coordinates activities to create safer, more resilient communities.</td>
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<tr>
<td>United Nations Regional Centre for Preventative Diplomacy for Central Asia (UNRCCA)</td>
<td>UNRCCA aims to liaise with the governments of the region on issues relevant to preventive diplomacy.</td>
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<tr>
<td>World Meteorological Organization (WMO)</td>
<td>WMO is dedicated to international cooperation and coordination on the state and behaviour of the Earth’s atmosphere, its interaction with the land and oceans, the weather and climate it produces, and the resulting distribution of water resources.</td>
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<tr>
<td><strong>Cross-cutting Regional and International Agencies</strong></td>
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<tr>
<td><strong>Asian Development Bank (ADB) and ADB Institute</strong></td>
<td>ADB is a regional cross-cutting agency supporting the Central Asia Regional Economic Cooperation Programme.</td>
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<tr>
<td><strong>Central Asia Regional Economic Cooperation (CAREC) Programme, CAREC 2030</strong></td>
<td>CAREC is a partnership of 11 countries and development partners working together to promote development through cooperation, leading to accelerated economic growth and poverty reduction. Focus issues include: economic and financial stability; trade, tourism and economic corridors; infrastructure and economic connectivity; and agriculture and water.</td>
</tr>
<tr>
<td><strong>The Regional Environmental Centre for Central Asia (CAREC)</strong></td>
<td>A leading regional knowledge hub in the field of environment and sustainable development recognised by national, regional and international partners. It was established in 2001.</td>
</tr>
<tr>
<td><strong>Centre for Emergency Management and Disaster Risk Reduction CESDRR</strong></td>
<td>CESDRR organizes emergency responses between Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.</td>
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<tr>
<td><strong>Cooperation Council of Turkic-speaking States (Turkic Council)</strong></td>
<td>The Turkic Council was established in 2009 as an intergovernmental organization, with the overarching aim of promoting comprehensive cooperation among Turkic-speaking States. Focus areas include: trade, investment, science, technology, education, health, culture, sports, tourism and enhancing legal cooperation. Members include: Azerbaijan, Kazakhstan, Kyrgyzstan, Turkey, Uzbekistan and Hungary (observer status). Partners include: UNDP, UNAOC, OSCE, BSEC &amp; PABEC, WCO, CICA, UNOSSC, UNWTO, ECO, OIC, ICSS &amp; SIGA.</td>
</tr>
<tr>
<td><strong>Eurasian Economic Union (EAEU)</strong></td>
<td>EAEU is an international economic union and free trade zone. The member States are Armenia, Belarus, Kazakhstan, Kyrgyzstan and the Russian Federation.</td>
</tr>
<tr>
<td><strong>International Fund for Saving the Aral Sea (IFAS)</strong></td>
<td>IFAS was established in 1992 on the initiative of the heads of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan for the purpose of improving the social, economic and ecological situation in the basin of the Aral Sea.</td>
</tr>
<tr>
<td><strong>International Think Tank for Landlocked Developing Countries (based in Mongolia)</strong></td>
<td>The International Think Tank produces and disseminates research and studies on trade-related topics, aid-for-trade, transport and transit, as well as databases on issues of interest to landlocked developing countries.</td>
</tr>
<tr>
<td><strong>Interstate Commission on Sustainable Development (ICSD) supported by UNEP</strong></td>
<td>ICSD developed the Regional Environmental Action Plan and the Framework Convention on Environmental Protection for Sustainable Development in Central Asia.</td>
</tr>
<tr>
<td><strong>Islamic Organization for Food Security (IOFS)</strong></td>
<td>IOFS provides expertise and technical know-how on various aspects of sustainable agriculture, rural development, food security and biotechnology.</td>
</tr>
<tr>
<td><strong>Ready4Trade Central Asia (2020-2023)</strong></td>
<td>This is a project supported by the European Union that aims to create, launch and promote trade facilitation online platforms in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.</td>
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</tbody>
</table>
| **Regional Environmental Centre for Central Asia** with country offices in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.  
- Central Asia Nexus Dialogue Project  
- Green Bridge Partnership Programme (GBPP) | This centre was established in 2001 by a joint decision of all five Central Asian countries, the European Union and UNDP. It is the environmental knowledge hub in the region. The Central Asia Nexus Dialogue Project fosters water-energy-food security nexus dialogue and multi-sector investment. The GBPP was initiated by Kazakhstan, the Charter has been signed by 16 countries and 16 non-governmental organizations from Kazakhstan, Russia, Finland, Kyrgyzstan, Germany, Austria, Turkey, Estonia, Uzbekistan and Tajikistan to improve access to green technology and investment. |

| **Other International Agencies** |
| **Global Environment Facility (GEF)** | GEF is the largest multilateral trust fund focused on enabling developing countries to invest in nature, and supports the implementation of major international environmental conventions including on biodiversity, climate change, chemicals and desertification. |
| **International Labour Organization (ILO)** | ILO aims to set labour standards, develop policies and devise programmes promoting decent work for all. |
| **International Union for Conservation of Nature (IUCN)** | IUCN is the global authority on the status of the natural world and the measures needed to safeguard it. |
| **Korea International Cooperation Agency (KOICA)** | KOICA is the Korean overseas aid agency for sustainable economic growth. |
| **United Nations Educational, Cultural and Scientific Organization (UNESCO)**  
  - UNESCO Intergovernmental Hydrological Programme (IHP) | UNESCO seeks to build peace through international cooperation in education, the sciences and culture. The UNESCO-IHP is the only intergovernmental programme of the United Nations system devoted to water research and management. |
| **United Nations University World Institute for Development Economics Research (UNU-WIDER)** | UNU-WIDER provides economic analysis and policy advice with the aim of promoting sustainable and equitable development for all. |
| **United Nations Water** | United Nations Water coordinates the efforts of United Nations entities and international organizations working on water and sanitation issues. |
| **United Nations World Tourism Organization (UNWTO)** | UNWTO is responsible for the promotion of responsible, sustainable and universally accessible tourism. |
| **World Data System (WDS)** | WDS supports universal and equitable access to quality-assured scientific data and data services, products and information across all disciplines in the Natural and Social Sciences, and the Humanities. |
| **World Health Organization (WHO)** | WHO leads global efforts to expand universal health coverage, directs and coordinates the world’s response to health emergencies, and promotes healthier lives. |
| **World Soil Information (ISRIC)** | ISRIC aims to serve the international community as custodian of global soil information. |
Annex 2: Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis for Leveraging Digital Technologies to Transform Agriculture in Central Asia

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>1. Awareness among Central Asian decision makers and farmers of potential to transition to digital, green, climate-smart agriculture technologies to improve resilience to floods and droughts, and reverse the degradation of soil and the environment as a whole.</td>
<td>1. Pervasive corruption undermining political and social stability.</td>
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<td>2. Central Asian governments’ interest to cooperate on a regional level (the Second Meeting on E-Agriculture of Central Asian Ministers facilitated by the United Nations Food and Agriculture Organization (FAO) and Kazakhstan, December 2020). Readiness to develop and implement comprehensive digital agricultural strategies.</td>
<td>2. High unemployment and poverty rates in certain areas, such as the Ferghana valley.</td>
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<td>3. Adding sustainable agriculture and rural development into national agendas.</td>
<td>3. Poor soil fertility in various areas of Central Asia.</td>
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<td>4. Huge agricultural/food, especially organic production potential. Kazakhstan and Uzbekistan aligning regulatory frameworks to international standards.</td>
<td>4. Limited technical expertise. Lack of workforce’s skills and knowledge meeting international standards.</td>
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<td>5. Initiatives promoting cross-border trade, such as the construction of wholesale distribution and agro-logistics centres, and the construction of the Central Asia International Centre for Trade and Economic Cooperation at the Kazakh-Uzbek border. A similar infrastructure is being developed in Kyrgyzstan and Uzbekistan with support from the Asian Development Bank.</td>
<td>5. Lack of internationally-recognized certification and standardization.</td>
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<td>6. Strong commitment and support from international partners, including businesses and international financial institutions. Cooperation of the FAO and the Islamic Organization for Food Security (Nur-Sultan) in a roundtable discussion on “Digital Agriculture: From Precise Farming to Smart Farms”.</td>
<td>6. Weak integration of domestic and practically non-existent subregional food chains, poor access to external markets and low credit resources.</td>
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<td>7. Huge variations in Central Asian countries’ legislative and regulatory frameworks.</td>
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<td>8. Inability of Central Asian countries to coordinate measures to act externally, if not as a single economic community, then from a unified position on key agribusiness issues.</td>
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<td>9. Digital divide, as well as rural digital divide, within and between Central Asian countries.</td>
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<tr>
<td></td>
<td>10. Lack of geospatial information system data, mapping, digital analytics, etc. in all Central Asian countries.</td>
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<tr>
<td>Opportunities</td>
<td>Threats</td>
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<td>------------------------------------------------------------------------------</td>
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<tr>
<td>1. Digital transformation to spur achievement of the Sustainable Development Goals.</td>
<td>1. Central Asian countries are landlocked. Having the United Nations “Special Needs” status, they are most vulnerable to external economic and other shocks.</td>
</tr>
<tr>
<td>2. Apply, if needed the FAO mandate in humanitarian intervention in Ferghana valley, as well as FAO’s databases and software to monitor and manage the many variables on water/land inventories.</td>
<td>2. An existential threat is at the water-energy-food nexus (e.g., the glaciers in Central Asia can disappear in 40 to 50 years). Sensitivity of agriculture to climate change.</td>
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<tr>
<td>3. Leverage the World Summit on the Information Society and partners’ digital applications and initiatives like the Ferghana Valley Internet Exchange Point project to reduce inter-ethnic tension and ease social problems in rural areas.</td>
<td>3. Land degradation and desertification are major challenges for all Central Asian countries and Mongolia (even mountainous Kyrgyzstan could lose up to half of its land as a result of desertification in the short term).</td>
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<tr>
<td>4. Implement the concept of smart farming with tech leaders on the application of cutting-edge technologies, such as big data, to provide optimized environments for various crops and boost export. Nare Trend Inc., a Republic of Korea’s agricultural technology company, completed the pilot project in Kazakhstan in October 2021.</td>
<td>4. Political instability in the subregion.</td>
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<tr>
<td>5. Capture and expand the niche in organic food production, for which global demand is growing. Scale up pilot projects for value chain development in selected areas.</td>
<td>5. Central Asia’s market competitiveness is likely to face more challenges amid growing “global land grab” trend. Large tech companies take over market shares in the agri-food sector. In turn, multinational agri-food companies take on the business models (digital platforms) of leading digital tech companies.</td>
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<td>7. Forge subregional partnerships in e-agriculture, including public-private partnerships and academia-industry collaborations. Subregional cooperation in e-agriculture can be a main driver of integration in Central Asia.</td>
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<td>8. Further develop and expand the digital agricultural platform – Coldau (Kazakhstan).</td>
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<td>9. Create conditions for establishing Central Asia’s agricultural market, stock exchange.</td>
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### Annex 3: Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis for Leveraging Digital Technologies to Address Water and Energy Challenges in Central Asia

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>1. There is no shortage of water and energy resources in Central Asia.</td>
<td>1. All the water-energy-food-nexus-related challenges are the result of poor market structure, and governance in the subregion.</td>
</tr>
<tr>
<td>2. Political will at the top level in Kazakhstan, Kyrgyzstan, Mongolia and Uzbekistan to develop and implement digital policies.</td>
<td>2. Lack of evidence-based policymaking from data collection, research and analysis.</td>
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<td>3. There are several digital programmes and initiatives at the national and subregional levels.</td>
<td>3. Huge variations in Central Asian countries’ socioeconomic development and legislative and regulatory frameworks.</td>
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<tr>
<td>4. Increased scientific attention and number of publications on the water-energy-food nexus globally, and particularly in Central Asia. There were only seven papers on Google Scholar search for “water-energy-food nexus” in 2011 while the quantity of papers reached 3,350 in 2019.</td>
<td>4. Digital divide within and between Central Asian countries.</td>
</tr>
<tr>
<td>5. Potential cascading effect – Central Asian governments’ interest in cooperating on e-agriculture development will naturally lead to cooperation on water-energy issues, and vice versa.</td>
<td>5. Reliable information about water resources is not available in a consolidated and credible platform.</td>
</tr>
<tr>
<td>6. Commitment and support from international partners, including businesses and international financial institutions. Central Asian countries often prefer a third-party or international partner rather than a bilateral one to address important development issues.</td>
<td>6. Lack of geospatial information system data, mapping, digital analytics, etc. The absence of data exchange prevents the initiation of a hydro-meteorological system that can guarantee rational resource allocation in the subregion.</td>
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<td>7. Although the systemic nature of water, energy and food insecurity is widely recognized, there is limited understanding of how to address these relationships.</td>
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<td>8. Lack of knowledge hinder the practical deployment of a cross-sectoral nexus approach in the management of natural resources.</td>
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<tr>
<th>Opportunities</th>
<th>Threats</th>
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<tbody>
<tr>
<td>1. Certain conditions for establishing innovative partnerships have been created or have emerged. The benefit-sharing theory and concept in transboundary water resources management and development should work for Central Asian countries.</td>
<td>1. Central Asian countries are landlocked. Having the United Nations “Special Needs” status, they are most vulnerable to external economic and other shocks.</td>
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<td></td>
<td>2. Central Asia is warming faster than the global average An existential threat is at the water-energy-food nexus (e.g.,</td>
</tr>
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</table>
2. Transboundary challenges related to the water-energy-food nexus, which have been a source of discord between countries for many years, can become drivers of integration. Leveraging practical digital solutions and the use of a nexus approach can lead to improved outcomes in the integrated management of water-energy-food resources.

3. Potential to incorporate Internet of Things and Internet of energy technologies into distributed energy systems to optimize the efficiency of energy infrastructure, and reduce water and energy wastage.

4. Innovative initiatives can be developed in upstream countries, such as managing renewable (wind) energy with advanced digital technologies, contributing to better adaptation to climate change and reduction of conflicts rooted in the allocation of resources (e.g., pilot projects to increase use of renewable energy and Internet of energy are being developed separately).

5. The green-digital nexus platform can drive integration in Central Asia and provide a strong impetus to further intersectoral and multi-level digital collaborations, strengthening mutual trust.

6. Potential to form a technology-based yet human-centred mindset and value creation.

7. Building on Central Asia’s competitive advantage to address competing goals in the subregion, such as fostering new growth engines, green energy, AI, e-commerce and digital finance. The experience of Kazakhstan and its neighbours in securing a balance in pipeline and transit transport policies in Central Asia is a good example.

8. Achieving genuine political and economic independence for Central Asian countries.

the glaciers in Central Asia can disappear in 40 to 50 years).

3. Political instability in the subregion.

4. Duplication of subregional initiatives and programmes, and lack of complementarity of efforts at the national level in Central Asia.


6. Emerging and continuing “land grab” are taking over the strategic sectors, including water and energy, by big powers and tech giants in Central Asia.
Annex 4: Digital Data Centres, Technology Parks, Innovations and Science Centres in Central Asia and Mongolia

Kazakhstan:
About 40 data centres (Kazakhtelecom 65 per cent and Transtelecom 35 per cent):
- 25 data centres of Kazakhtelecom (including Tier III data centre in Pavlodar)
- 9 data centres of Transtelecom (including Tier III data centre in Nur-Sultan) and five centres to be established shortly
- Server centre of governmental bodies (National Information Technologies)
Main technology parks and centres:
- Science Fund
- Fostering Productive Innovation Project (World Bank)
- Qazinnovations – National agency for innovation development
- Zerde National ITC Holding
- Autonomous Cluster Fund – Park of Innovative Technologies
- International Technopark of IT startups AstanaHub
- Astana International Financial Centre’s Fintech Hub
- Astana International Financial Centre’s Green Finance Centre
- Technopark of Innovation Cluster of Nazarbayev University
- Park of Innovative Technologies Alatau
- Huawei Kazakhstan Joint Innovation Centre
- Regional Environmental Centre for Central Asia

Kyrgyzstan:
- Data Centre of National Bank of the Kyrgyz Republic
- First commercial data processing centre (2018, NSP company)
- ElCat Data Centre (by IPTP Networks company, Bishkek)
- Data centre construction within the Digital CASA project (2019-2024)

Uzbekistan:
- Ferghana Valley Internet Exchange Point
- Innovation, Digital Technology and Economic Research Centre
- National Data Centre
- Five data centres (Tashkent), run by three organizations – Independent Telecom Innovations Metrotelecom, Independent Telecom Innovations ITI-IX and IPlus
- Huawei Uzbekistan Data Centre (for irrigation, engineering and agriculture)
- International Innovation Centre for the Aral Sea Basin under the President of Uzbekistan
- Technology park in Tashkent (former Mirzo Ulugbek Innovation Centre)
- Technology park in Andizhan
- Similar parks will be established in Nukus, Bukhara, Namangan, Samarkand, Gulistan and Urgench

Mongolia:
- Mongolia National Data Centre has the capacity to store and share all databases of all government departments
- Mongolia National Remote Sensing Centre, a research institute under the Meteorological Agency of Mongolia. They operate the satellite data storage system for MODIS, NOAA and FY satellites
- Mongolian Innovation and Technology Centre at Mongolian National University
- National Information Technology Park
- Atal Bihari Vajpayee Centre for Excellence in Information and Communication Technology (Ulaanbaatar)
- National IT Park Incubator, CLUB Co-working, Women’s Business Centre, and the Startup Council of the Mongolian National Chamber of Commerce and Industry

Turkmenistan:
- Technology Centre (within the Technopark in Turkmenistan)
Annex 5: Shared Subregional Challenges and Opportunities: Priority Areas for the DSCSD and SPECA (for Developing Transboundary Pilot Projects)

Climate change and its impacts in Central Asia. Global warming and climate change have effects on the high mountains of Central Asia. Rapid melting of glaciers will have consequences not only for the water balance in the Aral Sea basin. There is an existential threat at the water-energy-food nexus – by some estimates, the glaciers in Central Asia will disappear within 40-50 years. It leads to natural disasters like droughts, landslides and glacial lake outbursts, and it affects the socioeconomic development of the subregion. Avoidable environmental risks cause about one quarter of all deaths and diseases worldwide, amounting to 13 million deaths each year. Among them seven million preventable deaths annually are caused by air pollution – one of the largest risks to health. Cancer and chronic disease rates due to toxic dust clouds in the Aral Sea region are among the worst in the world. Still, not enough research has been conducted on the nexus, including on the glaciers, and not enough reliable knowledge and information is available. Additional efforts are urgently needed to fill these gaps to provide better policy advice.

Water resources management. The United Nations Educational, Scientific and Cultural Organization (UNESCO) Cluster Office in Almaty and the UNESCO Intergovernmental Hydrological Programme has a water management programme of Kazakhstan for 2020-2030. The programme includes international cooperation, updating of the legal framework, institutional reform, modernization and reconstruction of the water infrastructure, study of international best practices in creating a water market, digitalization of water management, introduction of a smart water project and training of specialists.

Similar programmes in the subregion are being implemented by the Regional Environmental Centre for Central Asia, International Union for Conservation of Nature and International Fund for Saving the Aral Sea. In Turkmenistan and Uzbekistan, a demonstration project aims to find technical solutions and investment opportunities to address the issue of intensive siltation of the Ruslovoe Reservoir.

Land degradation and desertification are major challenges for all Central Asian countries and Mongolia. Specialists estimate that even mountainous Kyrgyzstan could lose up to half of its land as a result of desertification in the short term. The Land Degradation Neutrality Target Setting Programme, a partnership initiative implemented by the Secretariat and the Global Mechanism of the United Nations Convention to Combat Desertification (UNCCD), finds that official statistics on degraded land in Kazakhstan is disputable due to the fact that monitoring of land quality as well as mapping of degraded land have not been carried out in the last 30 years. The comparison of UNCCD data with data of the National Centre of Space Research and Technology in Kazakhstan is ongoing. There is great need for geospatial information system data, mapping and analysis in all Central Asian countries.

In Uzbekistan, the Global Green Growth Institute and the Korea International Cooperation Agency are providing support in a Green Rehabilitation Investment Project for the Aral Sea and other collaborations.

In the subregion, the UNESCO project proposal that has been approved for funding by the Adaptation Fund is titled, “Reducing Vulnerabilities of Populations in the Central Asia Region from Glacial Lake Outburst Floods in a Changing Climate”, and by the Global Environment Facility is titled,
“Strengthening the Resilience of Central Asian Countries by Enabling Regional Cooperation to Assess High-altitude Glacio-nival Systems to Develop Integrated Methods for Sustainable Development and Adaptation to Climate Change”.

**Energy and water resources management**
is crucial for Central Asia’s sustainable development. Implementing Internet of Things and Internet of energy technologies into distributed energy systems can optimize the efficiency of the energy infrastructure, and reduce water and energy wastage.

Wind energy production can reinforce the hydroelectric systems so that more water is available. There is also significant potential for a conjunctive wind and hydro energy programme when the water saved by wind power is more valuable than the simple cost of production.

The preliminary assessment has been conducted and a conjunctive wind and hydro energy programme has been proposed. The programme can be further enhanced through the application of digital technologies including, but not limited to, modern remote data gathering and monitoring systems, advanced analytics and forecasting capabilities, and artificial intelligence (AI) based on computer-aided digital twin simulations for evidence-based decision-making and optimized performance. This programme can contribute to realizing national energy security benefits and effective water management in Central Asia.

The proposed programme plans to conduct a feasibility study, followed by a tendering and investment stage. The programme encompasses all sustainable development components – economic development through creation of local renewable energy industry, social development through employment and poverty alleviation, and environmental protection through clean energy and water resources management. The success of the programme will provide impetus to further establish and integrate variable renewable energy sources, facilitate subregional cooperation and transboundary electricity trade, and develop a coordinated subregional energy and water policy.

**Agriculture and food security.** On average, about 50 per cent of the population of Central Asia and Mongolia are engaged in agriculture. Digital technologies can contribute to increased agricultural productivity, improve the resilience of farmers to climatic shocks such as floods and droughts, and reverse the degradation of soil and the environment as a whole.

With the growth of technology, including the impending introduction of 5G networks, which will support a huge sensor network infrastructure, data-driven agriculture and the challenges of extracting meaningful insights from various data streams to influence policy decisions and provide actionable advisories for agriculture stakeholders are gaining prominence.

However, more than 70 per cent of global producers of agricultural and fish products do not have digital skills (e.g., to display and sell their own vegetables, fruits and harvested seafood on the online market). This is an acute problem for the Central Asian farmers and producers – since the collapse of the Soviet Union, the supply chains between Central Asian countries have been destroyed and generally have not yet been restored. The same is true for the industrial enterprises.

To promote cross-border trade, the Central Asia International Centre for Trade and Economic Cooperation is being constructed at the Kazakh-Uzbek border. A similar infrastructure is being developed in Kyrgyzstan and Uzbekistan with support from the Asian Development Bank.

In Kyrgyzstan, the Food and Agriculture Organization (FAO) is providing a USD50 million grant, including USD22 million earmarked for agriculture and the energy sector.
Towards a Central Asian Digital Strategy and a Digital Solutions Centre for Sustainable Development

In Kazakhstan, FAO and the Islamic Organization for Food Security cooperated in a roundtable discussion on “Digital Agriculture: From Precise Farming to Smart Farms”.

IBM Agriculture helps overcome obstacles to digital transformation by combining the power of AI, data analytics and predictive insights with unique agricultural Internet of Things data.

**Disaster risk reduction.** Disaster risks are becoming more frequent, complex and systemic. There is an urgent need to shift the balance from investing in response, to investing in prevention and in risk reduction.

A network of remotely-operated multi-parameter monitoring stations has been developed and installed in Central Asian high mountains. These stations not only monitor standard meteorological and hydrological parameters, but also deliver global positioning system data for atmospheric sounding as well as tectonic studies. The 15 observational data from the stations is transmitted at least once a day to a centralized geo-database infrastructure for long-term storage and data redistribution. Users can access the data manually using a web-interface or automatically using SOS requests. In addition, data is distributed to national meteorological and hydrological services through standard communication and data exchange channels.

**Health and telemedicine.** Due to the close relation between air pollution and climate change, failure to tackle air pollution and mitigate climate change results in a lost opportunity to gain health, economic and environmental benefits, such as more efficient transport and energy systems, a low-carbon economy, and healthier food systems with less impact on the environment. New approaches are needed that consider the consequences of actions in their entirety.

Under Digital Kazakhstan in 2004-2016, the national telemedicine network had connected 204 health facilities and 144 district and city hospitals, enabling remote consultations with regional and republican hospitals. However, legal and technical barriers prevent wide adoption of telemedicine.

**Digital co-production of public services, transparency and trust.** As the world becomes more interconnected, power is partially shifted from traditional governments and institutions to non-state actors and civil society. Co-governance becomes a new relation between government institutions, decision makers, non-governmental organizations and citizens. Decentralized economies and societies, underpinned by blockchain, will not only impact how we trade but will also radically change how we make, design and produce physical and digital goods.

The President of Kazakhstan emphasizes that the main goal of all reforms is to build an economically strong, democratically developed “listening state”, focused on meeting the needs of every citizen. A state in which people’s voices are heard by authorities and human rights are protected.

The President of Kazakhstan stated in September 2020: “A truly diversified, technological economy... must work to improve the well-being of the people. We must find a positive answer to the growing public demand for a fairer distribution of benefits arising from the growth of national income...”. Referring to the draft Law on Public Control (2021), the President of Kazakhstan stated: “We need to create a single legitimate institution of online petitions for citizens to initiate reforms and proposals. Such a mechanism must be completely protected from any manipulation”.

**Science and research.** Seventy-five per cent of commercialization of sciences come from research on basic science, including astrophysics, space and Earth observation. Astrophysics is a concentration of big data, AI...
and digital technologies. Technology transfer and spin-offs from astronomy have important applications in medicine, industry, environmental monitoring and consumer products, among others. At the same time, it is comparably a neutral area (free of special interest groups pressure) providing unusually promising opportunities for international cooperation.

Science and research organizations in Central Asia include the Fesenkov Astrophysical Institute and the Laboratory of Mathematical Modelling of Radiation Transfer Processes under the Ministry of Digital Development, Innovations and Aerospace Industry in Kazakhstan. The latter organization’s research areas include mathematical modelling of atmospheric processes over the territory of Kazakhstan based on satellite data, and development of a space monitoring system for greenhouse gases in the atmosphere over the territory of Kazakhstan. Also in Kazakhstan, the Laboratory of Space Environmental Monitoring develops methods and technologies for space monitoring and forecasting of natural and technological disasters and environmental pollution. The Drought Condition Monitoring Centre is developing the geoportal for space monitoring of drought and electronic atlas of pasture resources and climate. The Space Data Reception Centre (Almaty) and the Space Monitoring Centre (Astana) periodically receive and archive remote sensing data from various space vehicles and provide satellite information to all relevant government divisions in Kazakhstan to carry out research work.

Tourism industry. Several Kazakhstan and Uzbekistan joint programmes and projects, such as the Electronic Silk Road Visa project, are being implemented to boost tourism and trade. Moreover, the Central Asia Regional Economic Cooperation (CAREC) Tourism Strategy 2030 was endorsed at the 19th CAREC Ministerial Conference in December 2020 by Afghanistan, Azerbaijan, China, Georgia, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Tajikistan, Turkmenistan and Uzbekistan. One of the strategy’s pillars is market intelligence. This includes development and implementation of common methodologies for data gathering and production of tourism statistics following international best practices, and promotion of partnerships between public and private tourism stakeholders in the subregion for conducting joint market research to better understand customers’ preferences, desired experiences and needs. Digitalization of the tourism sector is a priority for all Central Asian countries.
Annex 6: Structure of the DSCSD and SPECA Platform