This project is funded by the European Union, implemented by CAREC in cooperation with IUCN, supported by EC IFAS

CAREC
BULLETIN
SPECIAL EDITION

Introduction to the bulletin

This issue of the CAREC Newsletter is a special issue dedicated to the interrelation (in modern terminology-nexus) of water, energy and food security. The bulletin provides information on the nexus approach, the views of regional and international experts, and information on the activities of the organization in promoting this approach.

The bulletin was published as part of the project «Central Asia Nexus Dialogue Project: Fostering Water, Energy and Food Security Nexus Dialogue and Multi-Sector Investment « implemented by CAREC with the financial support of the European Union in cooperation with the International Union forConservation of Nature and with the support of EC IFAS.

Yours faithfully,

Nexus Project Team

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This project is funded by the European Union, implemented by CAREC in cooperation with IUCN, supported by EC IFAS
This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of the authors and do not necessarily reflect the views of the European Union.

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The project at a glance

Central Asia Nexus Dialogue project: Fostering Water, Energy and Food Security Nexus Dialogue and Multi-Sector Investment

The project at a glance

The Central Asia Nexus Dialogue Project: Fostering Water, Energy and Food Security Nexus Dialogue and Multi-Sector Investment is an EU-funded project that is part of a global program with activities also in Latin America, Africa and the Middle East.

In December 2016, the Regional Environmental Centre of Central Asia (CAREC) and the International Union for Conservation of Nature (IUCN) jointly launched the 3-year project in Central Asia with the financial support (1.3 mln Euro total budget) of the EU.

The ultimate goal of the project is to prepare the ground for investments within the EU Nexus Regional Dialogues Programme (Phase II). To achieve this goal, the project supports the development of the regional investment programme "Aral Sea Basin Program" (ASBP-4) by fostering multi-sectoral dialogue and cooperation nationally and regionally. The beneficiaries of the project are the International Fund for Saving the Aral Sea (IFAS) and state bodies dealing with water and energy resources management, agriculture, economic development and environmental issues in five Central Asia countries.

Need for a multi-sectoral approach

Population growth, regional socio-economic development, climate change as well as changing consumption patterns contribute to increased demands for water, energy and food. To achieve security in all three WEF sectors, it is important to understand their interdependence and the inherent trade-offs necessary to meet the needs of the diverse users. Multi-sectoral cooperation and planning provides a framework for balancing the various interests of sectors in a sustainable manner.

In Central Asia, Water, Energy and Food security is at the heart of socio-economic and human development. The need for an integrated use of water and energy resources is recognized at the highest political level. And as the water and energy resources of the region

are highly imbalanced, Water, Energy and Food security can only be achieved through regional cooperation and a multi-sectoral planning approach.

IFAS as a key beneficiary

IFAS is the only intergovernmental structure dealing with water and environment at a regional level by advancing transboundary cooperation in Central Asia. It was established in the early nineties by the Heads of State of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan with the initial aim of funding joint projects and programs to save the Aral Sea and to improve the ecological situation in the surrounding area. Over the years, a socio-economic development focus at the scale of the entire basin has emerged in addition to environmental goals.

On 30 January 2018, the IFAS Executive Committee decided to launch the development of the fourth edition of the Aral Sea Basin Program (ASPB-4). This decision, combined with recent Presidents-level initiatives to enhance cooperation among Central Asian States, is a unique window of opportunity for integrating the WEF security nexus into ASBP planning process.

Further information and contact

For information on the Global Nexus Dialogues Programme visit the https://www.water-energy-food.org/regions/central-asia/
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Introduction to Nexus

From a series of papers on the Nexus approach to achieving water, energy, food and environmental security in the Central Asia

Saltanat Zhakenova, *Leading specialist, CAREC*

The Nexus approach: background

Modern global trends, related to economic growth, population growth, urbanization and changes in the structure of consumption objectively result in the increased consumption of water, energy and food. An increasing demand in the ecosystem services, related to water and land, accompanied by an increasing pressure upon the environment, and complicated by the climate change factor, has long been of concern for researchers and managers. The need of the individuals, involved in the decisions to gain access to optimal methodologies and tools, which make it possible to assess not only compromises, but also benefits of the synergies in the management of natural resources, has always been high. At the same time, scientific and practical research has not always been able to meet this demand, especially in the developing countries.

In particular, theoretically and methodologically, the issue of a transition to the systemic or, so-called, integrated management of water resources was reflected in the Dublin Declaration adopted at the International Conference on Water and the Environment back in the year 1992. Thus, one of the principles of the Declaration proclaimed the importance of a mass participation approach in the development and management of water resources, and laid the foundation for understanding the interconnections between all types of water use in the context of socio-economic development and environmental sustainability.

The next significant step in promoting the issue of the management of natural resources in its interconnection with economic growth and provision of basic services to the people of developing countries was the adoption of the eight Millennium Development Goals (MDGs), elaborated in the UN Millennium Declaration in the year 2000. Although this framework decision was not fully implemented, it allowed for the creation of new partnerships and highlighted the enormous importance of setting large-scale goals, based on the intersectoral cooperation.

The global financial crisis in the first decade of the 21st century, which triggered the food and energy crises in developing countries, led the world

community to recognise the need to adopt interrelated solutions that are beneficial for the main sectors of the economy and contribute toward achieving water, energy, food and environmental security.

In several years, various scientific research papers, thematic discussions and events led to an understanding of the need to consider the issue of interconnections on both research and political levels. As a result of this process, the International Conference "The Water, Energy and Food Security Nexus: Decisions for the Green Economy", held in Bonn on 16-18 November 2011, designated the water, energy and food sectors as the sectors with the greatest potential for mutually beneficial cooperation. At the same time, water was considered as the central element of the Water-Energy-Food (WEF) Nexus (Fig. 1), being under the effect of global trends and requiring support measures.

Thus, the so-called WEF Triangle formed the basis for all subsequent studies of the existing Nexus interactions at the global, regional, sub-regional, national and local (basin) levels. International organizations such as the European Union (EU), the United Nations Economic Commission for Europe (UNECE), the United Nations Environment Program (UNEP) and the United Nations Food and Agriculture Organization (UN FAO) analyzed the Nexus in the context of their mandate and, accordingly, considered additional elements. For example, the UNECE and, subsequently, UNEP considered ecosystems as an essential element of the Nexus. In this case, the ecosystems and the services derived from them were considered as a basis for ensuring water, energy and food security. At the same time, the World Business Council for Sustainable Development (WBCSD) analyzed WEF security in conjunction with components of business production as biomaterials, fibers and seeds.

In 2015, the UN Sustainable Development Goals, which replaced the Millennium Development Goals were embraced by the whole world, explicitly call for intersectoral cooperation, coordination and partnership within countries and regions, as one of the main factors for their realisation. Thus, the concept of sustainable development, which stipulates the synergy of economic, social and environmental factors, has found its practical reflection through the interdisciplinary approach and tools.

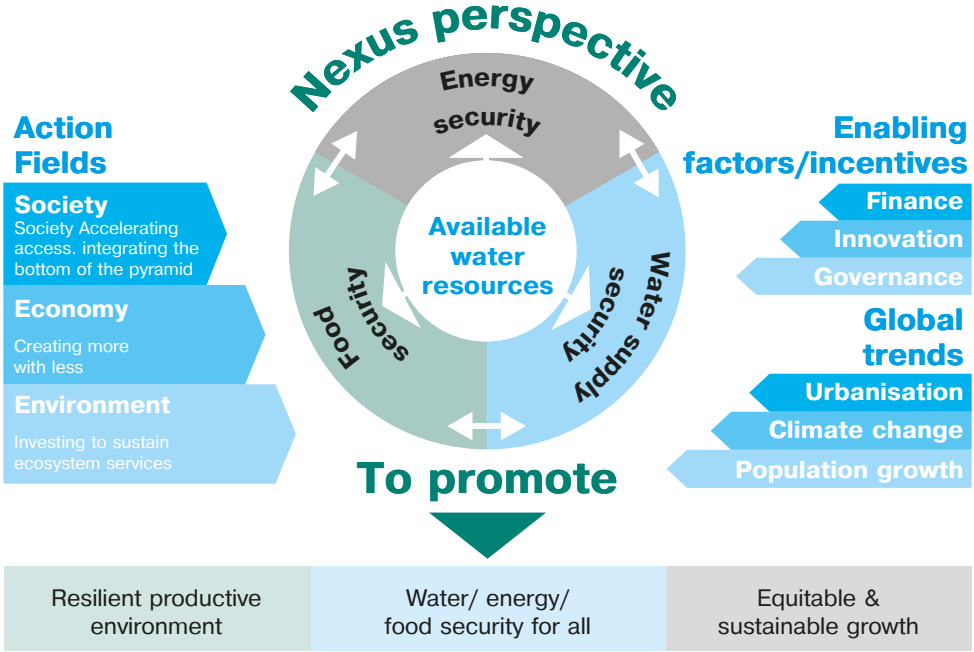

Fig. 1. *Prospects of the Water, Energy and Food Security Nexus.*

Source: *The Background paper for the Bonn 2011 Nexus Conference: The Water, Energy and Food Security Nexus, 2011.*

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The essence of the Nexus approach in the context of global risks

Saltanat Zhakenova, *Leading specialist, CAREC*

Since the First International Conference, held in Germany in 2011, which has drawn the attention of the international community to the importance of using the Nexus approach in planning governmental strategic policy, a number of case studies have been conducted. In spite of the fact that at different times additional components such as ecosystems, climate, land use, etc. have been taken into account in various studies, the general interconnections between the originally determined water, energy and food supplying processes, have remained practically unchanged (Fig. 1).

The growing interest in the analysis of interrelations and information for making effective inter-sector decisions to ensure water, energy and food security gives rise to several major factors of global significance:

1. Economic growth

The main economic indicators testify to the fact that the world economy has finally recovered after the global crisis, which broke out 10 years ago. It is expected that the growth of global GDP in 2018 and 2019 will make up 4.0 and 3.9 percent, respectively[1].

2. Population growth

In mid-2017, the world population was almost made up almost 7.6 billion people. This means that over the past twelve years, there has been an increase of approximately one billion. According to the forecasts, by 2100 the population shall increase by 47% in comparison to 2017, and shall be equal to 11.2 billion people[2] (Fig. 2)

3. Urbanization

Despite the fact that with the beginning of this century the growth rate of the urban population slowed down, the tendency of global urbanization has not changed (Fig. 3). So, in 1950, 70% of people around the world lived in rural areas, and less than 30% in cities. In 2014, urban residents made up 54% of the world population. It is expected that by 2050 a third of the world population will live in rural areas, and two thirds in cities.

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[1] *2018 Global Economic Outlook: As Good As It Gets, Goldman Sachs, 2017*
[2] *World Population Prospects – 2017 Revision: Global population, UNDESA, 2017*

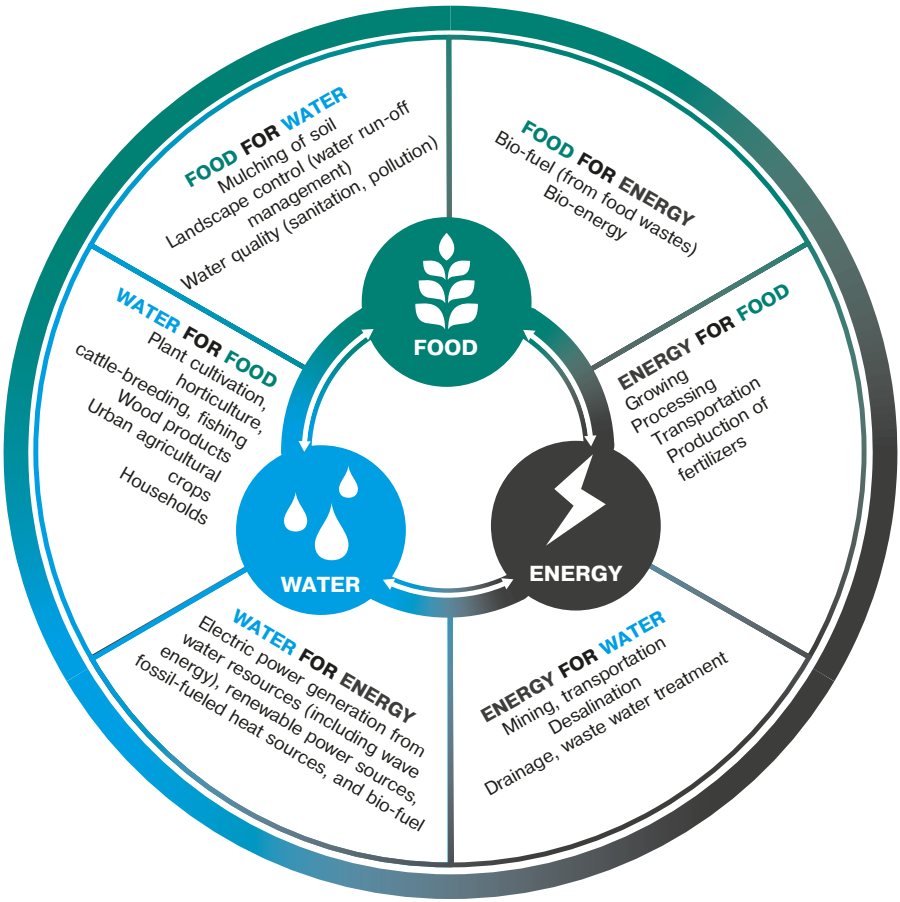

Fig. 1. *Direct interconnections between water, energy and food.*

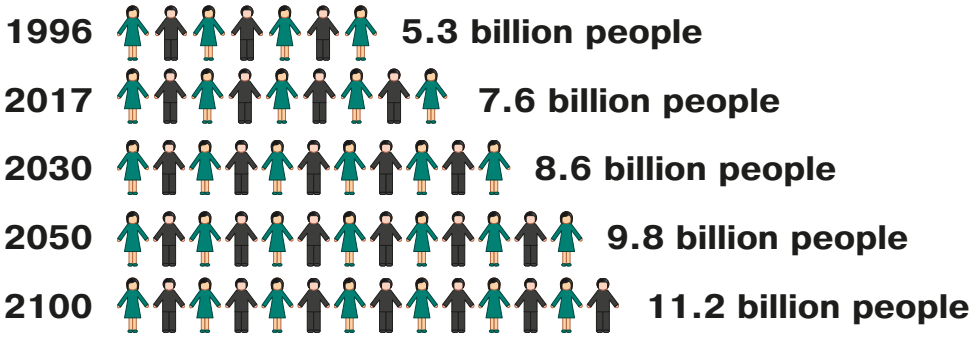

Fig. 2. *Population forecast. Source: prepared by the author on the basis of materials from the World Population Prospects - 2017 Revision: Global population, UNDESA*

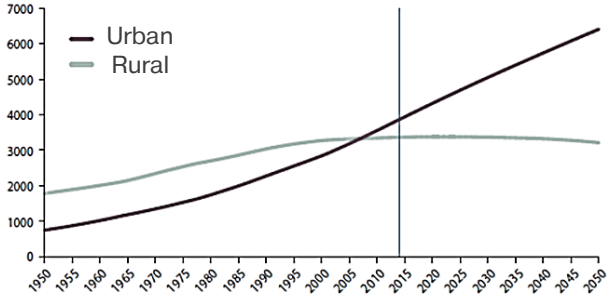

Fig. 3. *Urban and rural population, 1950-2050. Source: World Population Prospects – 2017 Revision: Global population, UNDESA*

4. Climate change

According to the latest Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) in 2000-2010 an average annual increase in the concentration of greenhouse gases in the atmosphere made up 2.2%, whereas during the period of 1970-2000 it was equal to 1.3%[3] (Fig. 4).

Global man-made emissions of greenhouse gases are the main indicator for assessing the impact of human economic activity upon climate change processes. Accordingly, the «chain» of climate vulnerability, associated with an increase of this indicator, has begun with the change of natural and anthropogenic systems on all continents and in oceans. This has resulted in changes of hydrological systems, affecting water resources in terms of their quantity and quality (Fig. 5). Subsequently, many species of flora and fauna have changed their geographic regions, seasonal activity, nature of migration, as well as their number and interaction with other species. With regard to the development of agriculture, positive changes in crop yields, connected with an

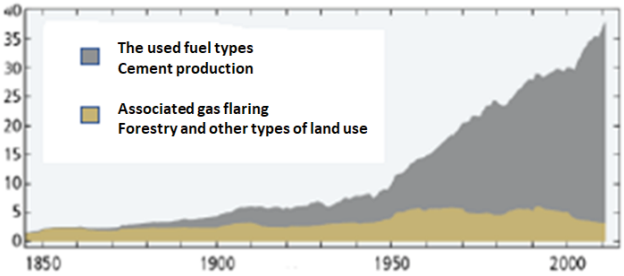

Fig. 4. *Global man-made emissions of greenhouse gases (equivalent to CO^2). Source: The Fifth Assessment Report (AR5), IPCC, 2014*

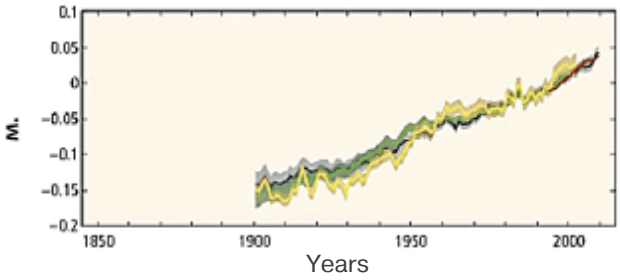

Fig. 5. *Global-averaged changes in the level of the world's oceans. Source: The Fifth Assessment Report (AR5), IPCCC, 2014*

[3] *The Fifth Assessment Report IPCC, WMO, UNEP, 2014*

increase in the surface temperature, have been observed in some areas of the Earth. (Fig. 6). At the same time, negative impacts have proved to be more common.

All the above factors in their totality produce an effect upon the growth and change in the structure of consumption of the water, energy and food resources. Moreover, they simultaneously increase the load upon the natural environment, reducing its self-restoring capacity.

The latest Report of the World Economic Forum on Global Risks[4] has shown the water, food and environmental crises as part of the top 10 risks, by the extent of their impact on the sustainable development of countries. The issue of inter-sector coordination of the management of these risks lies in an authentically systemic problem. Despite the fact that the connection between water, energy, food and ecosystems is universally recognized, the integrated vision thereof has not been sufficiently studied. Case studies, methodologies and tools, which assess the synergy of sectors in their totality, are of particular importance in the context of investing into developing economies, which shall finally make it possible to define a decision-making framework for politicians, business leaders, investors, non-governmental organizations and the public at large.

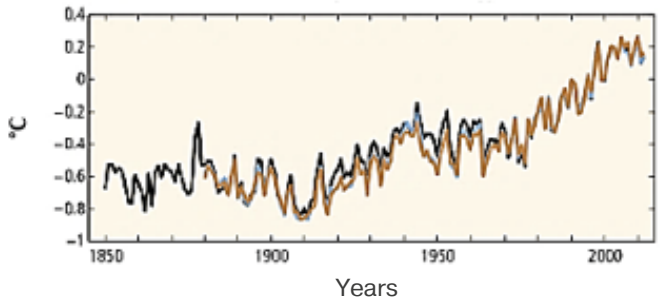

Fig. 6. *Global-averaged combined temperature anomalies of the Earth surface and ocean. Source: The Fifth Assessment Report (AR5), IPCCC, 2014*

The next paper will reveal the results of some studies and assessments of the water-energy-food interconnections, carried out at the global level.

[4] *The Global Risks Report 2018, 13th Edition, the World Economic Forum, 2018*

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Communicating about the nexus

Dr Olivier Cogels, *River Basin Management and Water Diplomacy Expert*

Securing sufficient access to water, energy and food in order to permit what will soon be 10 billion people living together on the earth is a pressing challenge for all of humanity. To help governments and international institutions to make more optimal use of the more and more scarce natural resources, a new concept is gaining increased attention in the international community: the "Water, Energy and Food Security Nexus".

What does this concept mean to you?

«Nexus» simply means «interdependence». This concept highlights the fact that water security, energy security and food security are inextricably linked. It means that investments or actions in one of these sectors have also implications in the other sectors. Hence, planning and management decisions to increase access to water, food and energy, should be achieved and agreed in a more coordinated and integrated way.

What is the "Nexus approach"?

The "Nexus approach" is a multisectoral approach that takes this interdependence between sectors into account at all levels: from top-level policy making and investment planning, to on the ground operational management. A smart approach that favours solutions that permit to produce more energy without threatening access to water and/or food. Offers Solutions that allow to secure availability of more food without penalizing the production of affordable energy. And last but not least, the Nexus approach contributes to sustainable solutions that respect our environment. In other words, solutions that are based on constructive dialogue, listening to each other's needs and constraints.

What are the benefits of implementing the Nexus approach?

The benefits of multisectoral cooperation for increased water, energy and food security leads obviously to more profitable investments and to more optimal management decisions. It also reduces the risks of conflicts between those who compete for scarce resources.

How do you see the potential of applying the Nexus approach at various levels in the future?

The Nexus concept is simple. But, translating it into reality is a complex challenge. Changing the way of policy-making and of managing institutions is indeed a long-term undertaking.

At the national level, it first of all requires a strong political will. The will of reforming the well-established sectorial approach, of sharing information and of working jointly on improving existing national policies and strategies. Although very challenging, this may have huge positive impacts.

At the regional level, high-level conferences and summits can generate the necessary impetus, and provide valuable guidance.

For basin organizations, multisectoral cooperation is already the usual way of doing business in the scope of the so-called Integrated Water Resources Management (IWRM). Simply stated, for the water people, the Nexus concept is seen as a part of the broader IWRM concept, but with a more specific focus on the interdependency between water, energy and food.

Finally, at the local level, applying the Nexus approach means above all more stakeholder dialogue and participation in the design and management of solutions to local water, food, and/or energy issues. A typical example is multi-sector stakeholder consultation for the building and operation of multipurpose dams.

Water, Energy and Food Security Nexus in the context of Central Asia

Dr Iskandar Abdullaev, *CAREC Executive Director*

What kind of examples of Water-Energy-Food Nexus in Central Asia do you know? Why do you think it is important?

Central Asian states are undergoing socio-politico-economic transitions since the early 1990s, including natural resources management systems. Energy-water-food linkages play a critical role for economic development and shared prosperity. These three resources are tightly interconnected, forming a resource and policy nexus. The regional political economies are still based on increasing resource abstraction instead of its reorientation toward efficiency improvements. Central Asian countries once practiced a quasi-nexus approach during the Soviet period when commodities were exchanged and water and energy development coexisted. During the course of "statehood construction" in Central Asia, regional integration was outpaced with more autonomous development pathways of each state. During the Soviet period, the centralized Soviet economy could be an example of a pseudo-nexus experience. The single centralized, planned economic umbrella with a common energy system and water infrastructure used to be dispatched by Moscow.

The disagreement between water for irrigation and water for hydropower in the Syr Darya and Amu Darya river basins is a widely known problem. During the Soviet pseudo-nexus period, the Toktogul Dam in upstream Kyrgyzstan and the Nurek Dam in upstream Tajikistan were designed as irrigation – hydropower facilities. Water was stored in reservoirs during the winter for release in the summer to satisfy downstream-irrigated agricultural needs. Hydropower, generated during the summer, was distributed through a united energy grid system.

The energy distribution was controlled by the United Dispatch Center, located in Tashkent City (Uzbekistan).

Positive results of the implemented approach were not only timely distributed water resources between countries and energy but also dispute settlement between upstream and downstream countries. Today, when these countries are no longer dependent on central government, but are independent, such system will

not work without readiness and better understanding of economic benefits that might stem from this approach.

What aspects of Water-Energy-Food Nexus can promote regional cooperation in Central Asia?

The Water-Energy-Food Nexus takes into consideration interlinkages between water-energy-food and the environment. The central role here belongs to water and its use in different sectors. As water in the region is a transboundary resource, it leads to competition between countries in the region. Regional water cooperation that existed during the Soviet period is not operational anymore due to the newly formed independent states trying to secure their resources. Today, water management systems of countries face several difficulties, including poor governance and weak institutional capacity, an absence of appropriate wide stakeholder participation and integration of intersectoral approaches into water planning, governance and mistrust between countries. Inefficient water management influences other sectors which the main competition between water for energy and water for irrigation. So, Central Asian countries should further collaborate on ways to develop agreements and policies to achieve mutual benefits and mechanisms to compromise while preserving both the environment and economic sustainability.

What is necessary in order to strengthening intersectoral cooperation?

Water issues in the region have been the centerpiece of the post-independence period of Central Asian history. The existing mode of water governance is more “watercentric” than integrative. Without a systemic and long-term approach to the water problem, Central Asia cannot develop sustainable solutions for water, energy, food, and environmental issues. These are interlinked and interdependent sectors.

The countries of the region have declared their commitments to the Paris Agreement, a global climate change agreement, and the Sustainable Development Goals (SDGs). Yet, the implementation of these commitments requires the establishment of intersectional coordination and monitoring mechanisms. New challenges such as a growing population and climate

change require more coordinated policies and an intersectoral approach in managing and governing water resources. Limited water resources, growing land deterioration and water quality degradation cannot be sufficiently addressed via sectoral improvements only. The Water-Energy-Food Nexus approach could bring more opportunities and options if interlinkages are understood and efficient mechanisms for better coordination are installed.

Are the Central Asian countries ready to implement the Water-Energy-Food Nexus in decision-making processes?

An understanding of a need to cooperate between countries is growing. Decreasing of water and land resources and increasing food scarcity drive countries to review their conventional approaches in this regard.

Long-term and integrative planning is a key element of the nexus approach. The water legislation of countries provides stakeholder and public participation platforms, such as public consultative–advisory basin councils in Kazakhstan, Kyrgyzstan and Tajikistan and ad hoc technocratic intersectoral water councils in Uzbekistan and Turkmenistan. Therefore, basin councils may act as a platform for both balancing the decision-making power and the empowerment of local communities and facilitation of long-term basin planning and nexus implementation. Successful practices in the region, even small ones can be shown as a positive result of integrating a nexus approach and at the same time help to promote the approach.

Beyond that, food security is a component where the nexus approach can play a specific role and where countries can probably compromise. Activities on this component will also influence the social-economic situation in Central Asia.