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F.T. Kukeeva, N.N. Sembekov*

Al-Farabi Kazakh National University, International Relations Department, Kazakhstan, Almaty
*e-mail:sembekov.n@gmail.com

Environmental risks in Central Asia and its impact on regional cooperation

In the XXI century, questions of environmental problems in Central Asia go beyond the region, defying the international community. It is known, environmental issues that were raised repeatedly on the agenda of international tribunes and scale concepts of environmental security requires clear actions and decisions in some areas of international politics.
During the Soviet period lands of Central Asia used for production. These and other policies were hold incorrectly, aiming only to get economic benefits. The results were destructive for the development of CA. The region and its inhabitants had to pay for its costs: environmental degradation; water shortages and pollution, health problems. Nowadays these problems are still actual and need solutions. Therefore leaders of CA countries looking ways of cooperation in order to provide environmental security.
Key words: environment, ecology, security, cooperation.

Ф.Т. Кукеева, Н.Н. Сембеков

**Орталық Азиядағы экологиялық қауіптер
және оның аймақ мемлекеттерінің ынтымақтастығына әсері**

XXI ғасырда Орталық Азияның экологиялық мәселелері аймақ шеңберінен шығып, әлемдік қауымдастыққа үнқату үстінде. Осы экологиялық мәселелер халықаралық деңгейде бірнеше рет көтерілді және әлі де көтеріліп жатыр, сондай-ақ осы мәселелер халықаралық ұйымдардың күн тәртібіне енгізілгені баршаға аян. Бүгінгі күні, экологиялық қауіпсіздіктің алып тұжырымдамалары халықаралық саясаттың кейбір салаларында нақты қадамдар жасауды және тиімді шешімдер табуды қажет етеді.
Кеңестік дәуірде Орталық Азия аймағының жерлері өндіріс үшін көптеп пайдаланылды. Дегенмен, кеңестік жетекшіліктің осы және өзге де саясаттары дұрыс бағытта іске асырылған жоқ. Себебі бұл саясат тек экономикалық пайда табуды ғана көздеген болатын. Осының салдарынан Орталық Азия аймағы үлкен зардап шекті. Аймақ және оның тұрғындары әлі күнге дейін осы саясаттардың келесідей залалдарын көруде: қоршаған орта жағдайының нашарлауы, ауыз суының жетіспеушілігі, ауа-райының ластануы және денсаулықтың нашарлауы. Осыған орай, Орталық Азия мемлекеттерінің көшбасшылары аймақтың экологиялық қауіпсіздігін қамтамасыз ету және аймақ халықтарының мүддесін қанағаттандыру мақсатында ынтымақтасу жолдарын іздеуде.
Түйін сөздер: экология, қоршаған орта, қауіпсіздік, ынтымақтастық.

Ф.Т. Кукеева, Н.Н. Сембеков

**Экологические риски в Центральной Азии и их влияния
на сотрудничества государств региона**

В XXI веке концептуальные проблемы и угрозы безопасности экологических проблем в Центральной Азии вышли за рамки региона, бросая вызов международному сообществу. Известно, что эти экологические вопросы неоднократно поднимались в международных организациях. На сегодняшний день, масштабные концепций экологической безопасности требуют четких действий и решений в некоторых аспектах международной политики.
В советское время земли Центрально – азиатского региона многократно эксплуатировались для производства, были площадками для тестирования атомных, химических и бактериологических оружий и т.д. Однако, подобного рода политические решения советского руководства были недальновидными, так как были направлены только на получение незамедлительных экономических и военных выгод, несмотря на явные признаки дальнейших серьезных экологических проблем для региона. Как показывает время, результаты были неутешительными для стран Центральной Азии. Регион и его жители до сих пор испытывают тяжести той политики: ухудшение состояния окружающей среды, нехватка воды и загрязнение, а также проблемы со здоровьем. В

настоящее время, эти проблемы по-прежнему актуальны и требуют незамедлительных решений. Поэтому, на сегодняшний день, руководство стран Центральной Азии ищут пути сотрудничества в целях обеспечения экологической безопасности во благо народов региона.
Ключевые слова: экология, окружающая среда, безопасность, сотрудничество.

Introduction: Environmental risks and mismanagement of the environment can develop to serious sources of conflict within and between states. These conflicts are generally not the result of environmental problems as such but of the incapability or unwillingness of governments to find solutions to these problems or efficiently implement inter-state agreements on management of the environment. Environmental risks are primarily the result of resource-intensive, sometimes resource-wasting patterns of production and consumption, and of inadequate agricultural practices. Often they are the product of but also enforce larger socio-economic problems such as population growth, poverty, forced migration, refugee movements, political instability, ethnic tensions, and border disputes.

Environmental and socio-economic problems combined can put national and international security at substantial risk. The Central Asia (CA) is subject to a number of serious environmental problems among which the desiccation of the Aral Sea, as result of the cotton monoculture, the pollution of the Caspian Sea, the pollution of drinking water, salination of the soil, soil erosion etc. and the consequences of nuclear weapons testing at Azgyr, Lira, Aral, Say-Utes, and Semipalatinsk-Kurchatov in Kazakhstan.

These environmental problems were already serious political issues during the Soviet Union period and are now crucial for political and economic development and stability. For example, safeguarding the access to water already has let to some border disputes between the five countries. The CA economy to a great extent depends on agricultural production. The salination of the soil undermines this important source of income.

Landlocked Central Asia is home to two major rivers, the Amu Darya and Syr Darya, as well as two inland seas, the Caspian and Aral. But water resources in the region are disputed. The Caspian Sea is heavily polluted and the Aral Sea is on the verge of extinction. Massive irrigation systems were developed in the past to sustain water-intensive crops such as cotton, wheat and rice in the steppes and deserts of Kazakhstan, Uzbekistan and Turkmenistan. These systems have caused Central Asia's largest environmental disaster – the drying up of Aral Sea – and they have the potential to further threaten the livelihoods of Central Asia's population.

Water has been a matter of contention between upstream and downstream countries, in particular between downstream Uzbekistan and the two upstream countries, Kyrgyzstan and Tajikistan. Water management problems are at the heart of regional political and economic tensions. But any successful effort to deal with environmental issues also faces multiple challenges at the national level, from technical deficiencies to lack of capacity and resources to lack of political will and economic incentives. The infrastructure inherited from the Soviet era is, in some cases, no longer viable, and in others, it requires heavy maintenance, which the weak and impoverished states are not able to afford. As pressing a problem it is, water management is just one part of the wider environment-security nexus in Central Asia. The region is prone to earthquakes, mudflows and landslides. It has been severely affected by climate change and it still has hazardous Soviet nuclear waste that must be cleaned up. Considering Central Asia's lack of disaster preparedness, weak governance, insufficient resources and growing populations, the region seems especially vulnerable to extreme weather events.

Main part: The harsh climate conditions in CA in the past impacted specific patterns of human settlement and activities. A great part of the land–home to fragile and unique ecosystems (e.g. taiga, tundra, steppes)–could not sustain considerable human population and remained in their natural state well into the 20th century and some parts even until now. In other areas, such as dry grasslands or tundra, only nomadic pastoral agriculture was possible and no stable human settlement took place. Until the early 20th century most of the agricultural land was either in large estates or in village communal property [1]. Despite its aridity CA has a long history of agriculture and settlements and some of the oldest known sites of irrigation in the world

[2].Water was seen as a 'Gift from God' that could not be owned or controlled by an individual [3].

After the Bolshevik Revolution in 1917 and the subsequent emergence of the Soviet Union water and land was taken "out of the hands of traditional elders and councils with whom it resided" [4]. What was established instead were a number of government bodies who were responsible for water management. Like Tsarist Russia the Soviets were convinced that CA could develop to a major cotton producer if the irrigation system was developed. In 1918, the Council of People's Commissars allocated 50 million roubles for the development of an additional 550,000 hectares (ha) of irrigated land. By the 1920s when all CA had come under Soviet rule it had developed into a major exporter of cotton crops and foodstuff for the Soviet Union. Cotton supply had risen to 50 percent. More than a half of total income from agricultural production in CA (not counting the khanates [5]Bukhara, Khiva, Kokand) came from cotton.

During the Soviet period an additional 4.9 million hectares of new land were opened for production. The total area of land under irrigation then amounted to 7.5 million ha. New canals and irrigation projects were constructed as well, the most notable being the great Ferghana Canal, completed in 1939.

In contrast, industrialization in CA was not very extensive. Poor quality coal was mined as well as some copper and iron. Until the beginning of the 20th century main economic activities in CA remained the processing of cotton, leather tanning, wool washing, and silk spinning [6].

While Moscow benefited economically from the distorted and destructive development of CA, the region and its inhabitants had to pay for its costs: environmental degradation; water shortages and pollution; unskilled menial labour; health problems including high rates of infant mortality, respiratory illnesses, typhoid etc. without receiving any significant material benefits[7].

The post-Soviet CA states have now to face the legacy of the policies. Environmental problems in post-Soviet CA pose a serious risk to human and regional security.

The most urgent environmental risks to human security in Kazakhstan are issues related to water, radiation and waste. Kazakhstan borders the Aral Sea (together with Uzbekistan) – once the world's fourth largest brackish inland water reservoir and now one of its most devastating environmental problems with an almost collapsed ecosystem. During the period of Soviet rule great amounts of water were diverted from the rivers Amu Darya and Syr Darya [8]for the expansion of cotton production in CA. This system of irrigation had a great impact on the water balance of the Aral Sea.

In only 30 years (1960-1990) the surface of the Aral Sea shrank to a half of its original size from 66,900 km2 to 36,500 km2. Its volume shrank by two thirds from 1,090 to 310 km3. By 2010 it is expected that the Aral Sea's size will have declined to 21,058 km2 and its volume to 124 km3 [9].

The deterioration of the Caspian Sea to which Kazakhstan is adjacent beside Azerbaijan, Iran, Russia and Turkmenistan is another environmental risk to human security in Kazakhstan and the other littoral states.

The Caspian Sea is the largest inland sea in the world and produces almost all black caviar in the world. About 10 million people inhabit the area around the Caspian Sea most of whom living from the Sea especially fishing.Additionally the Caspian Sea owns a great amount of the world's oil and gas resources. The Energy Information Administration estimates the Caspian Sea's proven oil reserves to be between 17 and 33 billion barrels (3 percent of the world's total). Proven natural gas reserves are estimated at 232 trillion cubic feet (tcf) (4 percent of the world's total) [10].

The existing and planned exploitation of the Caspian hydrocarbon resources–heavily promoted by Transnational Oil Corporations– is a direct as well as indirect source of environmental problems in CA and the Caspian region. Environmental risks include: fluctuations in the sea level, surge effects, the increasing salinity of groundwater, industrial pollution, loss of biodiversity and other factors.

Trans-border environmental problems could develop to trans-border conflicts. The unresolved question around the legal status of the Caspian Sea, how to regulate the exploitation of the Sea's resources and the geopolitical interests of the five littoral states could even worsen conflicts [11].At the same time the littoral states' interests to profit the most from their hydrocarbon resources have led to a neglect of environmental issues making it difficult to formulate a co-ordinated regional policy on environmental security and management of the Sea's resources. Such a policy would be necessary

to improve the environmental situation in the Caspian region.

Other environmental risks of concern in Kazakhstan are water supply for agriculture and industry and drinking water quality standards. Because of the deterioration of the Aral Sea and the Caspian Sea Kazakhstan and also Uzbekistan have a great dependence on river-systems for its water supply particularly from the Syr Darya.The relations between Kazakhstan and Uzbekistan are tense both because of land and water disputes [12].

Another major environmental risk in Kazakhstan are the consequences of its high levels of radioactivity in the Semipalatinsk and other regions as result of nuclear testing during the Soviet period where natural radioactivity is two to three times higher than the global average posing long-term health risks.

An additional environmental risk to human security are large amounts of industrial waste and inappropriate waste management in Kazakhstan. Major industries are located in the eastern part of Kazakhstan. Improper waste disposal and the great amount of hazardous wastes pose a risk to the contamination of surface and groundwater by heavy metals [13].

The most significant environmental problems in Kyrgyzstan are related to irrigation for agriculture, and large-scale gold and uranium mining.

Kyrgyzstan is CAs main supplier of water for irrigation. While having a great amount of water it has a scarcity of coal, oil, and gas resources. In exchange for providing the other CA countries with water Kyrgyzstan receives natural gas, coal, and oil from its two neighbours, Kazakhstan and Uzbekistan. There are even official agreements that oblige Uzbekistan and Kazakhstan to supply Kyrgyzstan with heating resources in exchange for water supplies.

In the mountainous region of Kyrgyzstan rises the Syr Darya river-one of the two main rivers of the CA region. It then flows through Uzbekistan and Kazakhstan to finally empty in the Aral Sea. The Syr Darya supplies water to the massive irrigation systems on which the agricultural economies of CA depend.

Other key environmental risks are the mining of uranium, heavy metals and mercury, as well as the storage of past mining wastes. Environmental pollution by these dumps could cause serious human health risks, e.g. by contaminating drinking water and arable soil.

In Tajikistan the main environmental risks are the impact of natural disasters, increasing land erosion and salination, and limited availability of clean drinking water.

The country is subject to earthquakes, landslides, mudslides and floods. Often these natural disasters are worsened by human activities such as the use of the mountainous areas and lowland plains for cattle grazing, deforestation, small-scale agriculture, mining and road building [14].

Salination has become a widespread problem. It is the result of natural conditions and improper irrigation and drainage practices. In Tajikistan only 7 percent of the territory is arable but agriculture still plays a significant role for the economy. Every year 4,000-5,000 ha are taken out of use for agriculture because of salination and waterlogging. Contamination of land is also the result of uranium mining waste and high radiation levels in some areas [15].

Environmental degradation in Turkmenistan is largely the result of soil erosion and salinization, use of rivers for irrigation and human activities, water and soil pollution by pesticides and the building of dams. It causes desertification of oases and mountain landscapes as well as dropping groundwater levels and water loses in the Kara-Kum canal due to bad infrastructure, and increasing water use for the urban population and for industrial use [16].

In Turkmenistan 80 percent of the land are desert. Intensive cotton farming in the last decades have drained freshwater reserves and caused the salinization of the Amu Darya River. Water scarcity has an immediate influence on human living conditions and on agricultural productivity.

Turkmenistan and Uzbekistan have experienced tensions in regard with water allocation from the Amu Darya.

Uzbekistan's main environmental risks are water and agriculture.

All but one province in Uzbekistan depend for 71 to 100 percent on external water supply.

The agricultural heritage of the monoculture of cotton production makes land deterioration and contamination Uzbekistan's second largest problem for human security. The deterioration of the Aral Sea leads to severe health problems, and the lack of employment to migration from the Aral Sea to other

regions in the country which now have to cope with an immense increase in population density [17].

In Uzbekistan the relation between ethnicity and territory is the most accentuated and the most fragile to conflict in CA. Uzbekistan has only little control of its water supply and has large a Tajik population that dominates its water supply. Two out of four areas with the highest water vulnerability in Uzbekistan are located in the Ferghana Valley.

The fertile Ferghana Valley covers only 5 percent of the territory in post-Soviet CA but inhabits 20 percent of the region's population, including large minorities of ethnic Kyrgyz, Tajiks, and Russians. It is split between three countries: Uzbekistan, Kyrgyzstan and Tajikistan. The Ferghana Valley produces a major share of the country's cotton and grain crops and contains numerous manufacturing plants, as well as natural gas and oil fields.

Among the most important political movements that emerged during the late Soviet period in CA and were closely related to environmentalism were Nevada-Semipalatanisk in the Kazakh Soviet Socialist Republic (SSR) and Birlik in the Uzbek SSR.

Like Nevada-Semipalatinsk Birlik opposed environmental degradation in Uzbekistan but was explicitly more nationalistic.In Uzbekistan environmental issues were associated with ethnic local violence in the 1980s in Batken-Isfara, Osh and Samarkand [18].

At the end of the first decade of the XXI century Central Asia faces enormous changes of economic and political nature. The region experiences the time of sharp deterioration of internal contradictions and structural economic and political transformations.

Environmental degradationat localand regional levels as well as lackof resources (exacer bated by population growth, unequal distributionof wealthandglobalclimate change) areimportant contributors tothe appearance, enhancement ormaintenance ofnational security threatsthatcouldresult inpoliticalinstabilityandserio usconfrontationsin local societies.[19].

Regional cooperation: management of stability. The environmental risks in CA discussed above pose risks not only to human health and personal security but also to regional stability. Environmental risks develop to security risks when there is a lack of access to resources for basic needs (water, soil, air and energy), when widespread negative impacts on public health become evident and when agricultural productivity, energy security and economic development are prevented.

Co-operation between the CA states at the regional level is necessary not only to reduce environmental pressure but also to reduce the security risks that derive from it. Inter-state co-operation particularly on water allocation has been subject of various regional and bilateral negotiation processes in recent years, often resulting in formal agreements, joint commissions and the development of policies and measures for joint water management [20].

Conclusion: From the above, it should become clear that climate change dynamics in the region will be multifaceted and complex with the potential for cascading effects and intricate feedback loops. Key stressors have not been identified yet and impacts not yet quantified. This clearly translates into an increased risk of exposure in Central Asia.

What is urgently needed in the region is a new long-term trans-boundary water and energy resource-sharing agreement that is efficient, fair, and flexible. Two distinct management challenges exist at different time scales for adaptation to and mitigation of the impacts of environmental change in Central Asia. These are real-time resources management issues as well as long-term planning issues. Real-time management issues include identifying efficient reservoir release policies during shortage conditions and optimizing irrigation deliveries. Another problem is the inter-temporal management of reservoir storages under hydrologic uncertainty, using short and medium range operational forecasts. Long-term planning issues must address the effect of climate change on water resources availability, the effect of intensified irrigation on agriculture and the increasing demands for electrical power, and the design of water management policies and institutions as well as the extension of hydropower infrastructure in order to develop a coherent risk management plan.

Quantitative models must be developed to allow the measurement of trade-offs stemming from the allocation of these resources while accounting for future economic and environmental uncertainties. Such trade-offs would allow the hydrocarbon-rich but water-poor republics to provide energy compensation in return for guaranteed water supplies. As part of this process, a supra-national institution should be established to explicitly deal with questions of natural resources allocation in the region, as well as to foster dialogue and mutual trust between the multiple stakeholders.

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