The Ecological Damage Inflicted on Central Asia by Russian Rule
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> *It is a sad settlement - Muynak. It once lay in the spot where the beautiful, life-giving Amu Darya flowed into the Aral Sea, an extraordinary sea in the heart of a great desert. Today, there is neither river nor sea. In the town the vegetation has withered; the dogs have died. Half the residents have left, and those who stayed have nowhere to go. They do not work, for they are fishermen, and there are no fish. . . If there is no strong wind, people sit on little benches, leaning against the shabby and crumbling walls of their decrepit houses. It is impossible to ascertain how they make a living. . . . They are Karakalpaks.*
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> - Ryszard Kapuscinski, 1994

Central Asia, encompassing the southern provinces of the former Soviet Union, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, is rich in natural resources, most still untapped. Large quantities of water are stored in the mountain glaciers in Kyrgyzstan and Tajikistan. Kazakhstan, Turkmenistan and Uzbekistan have huge and mostly unexplored oil and gas deposits. At the same time, almost half of the populations of these countries live in poverty and lack sufficient natural resources to sustain their livelihoods. The region suffers from significant ecological disasters and the legacy of the past. Central Asia was the nuclear testing ground for the Soviet Union since the late 1940s. This has impacted upon human health and fragile ecosystems. To supply cotton crops to the Soviet Union, large-scale irrigation systems were built, contributing to the degradation of the Aral Sea. Soviet industrialization and modernization in Central Asia took an enormous toll on the environment and population. Driven by the Russian need for increased agricultural production, the drive to industrialize, the demands of the Second World War, and competition of the Cold War, Central Asia became an ecological disaster area between 1928 and 1991.

Central Asia is an arid environment in which three-fourths of the land mass is desert. The majority of the population lives in rural areas, concentrated in the oasis regions along the two main rivers: the Amu Darya and the Syr Darya. These rivers originate in the eastern mountains of Central Asia and then flow across the Kara Kum and Kyzyl Kum deserts before emptying into the Aral Sea, a large terminal lake in the midst of the desert. For centuries, the territory between the two rivers was coveted by both the British Empire and the Russian Empire because the Great Silk Road ran through it. As a result of the struggle to gain access to Central Asia, British and Russian explorers generated numerous reports detailing the physical characteristics of the water basin and the economic activities of the local populations. In his account of reaching the shores of the Aral Sea with the Imperial Russian Geographical Society in 1874, Major Herbert Wood observed, “Quantities of fish of large size sport in these foaming waters, over whose troubled surface flights of gulls and other aquatic birds hover and circle in search of their prey.” In reference to the economic activity of the local population, Wood noted that “a great number of Karakalpaks [who mainly live in the lower reaches of the Amu Darya and in the former delta of Amu Darya on the southern shore of the Aral Sea] are fishermen, who take, in fixed nets, quantities of a large, coarse sturgeon, with which the waters of the Amu abound, and which, dried and salted, form the staple of a very brisk trade carried on by the boats of the Amu and its branches, for distribution among the nomads of the Khwarezmian deserts and the sedentary populations of Central Asia.”

It wasn't until the period of Soviet rule and their drive to industrialization that policies imposed on the region had the greatest ecological impact. One can argue that the emergence of Soviet communism in the twentieth century can be seen, like the creation of the Mongol empire in the thirteenth century, as Christian writes, "…as a final expression of the distinctiveness of Central Asia's ecology, ways of life and history." The period of 1928 to 1938 exacted a huge toll on Central Asia. No ten years in the history of any Western country ever showed such a rate of growth as the decade of the first two 5-year plans in the Soviet Union. From 1928 to 1938, production of iron and steel expanded four times and that of coal expanded three and a half times. In 1938, the Soviet Union was the world's largest producer of farm tractors and railway locomotives. Two plants alone, at the new cities of Magnitogorsk in the Urals and Stalinsk 1,000 miles farther east, produced as much iron and steel as the whole of the Russian empire in 1914. In 1939 the Soviet Union, as measured by purely quantitative standards, was surpassed in gross industrial output only by the United States and Germany.

In order to sustain growth, the Soviet central plans called for a marked development of industry east of the Urals, and so brought a modernization of life for the first time to Central Asia. New industrial cities rose in the old Turkestan. Copper mines were opened in the Urals and around Lake Balkhash, in southeastern Kazakhstan. Lead mines were opened in eastern Asia and in the Altai Mountains. New grain-producing regions were developed in the Kazakh Soviet Socialist Republic. The capital of the Uzbek Soviet Socialist Republic, Tashkent, formerly a remote town of bazaars and caravans, grew to be a city of over half a million. It became a center of cotton culture, copper mining, and electrical industries, connected with the north by the newly built Turksib Railway. The opening of all these new areas, requiring the movement of food to the Uzbek Soviet Socialist Republic in exchange for cotton or of Ural iron to the new Kuznetsk cities, demanded a revolution in transportation. The railroads in 1938 carried five times as much freight as in 1913. Central Asia was for the first time turning industrial.

By October 1924, the foundations of Soviet Central Asia's five republics were laid and the administrative, political and economic structure could be fashioned and controlled by Moscow. The socio-economic restructuring changed the old order and established a new one to the same degree it had done so in Russia. In *A History of Inner Asia* Soucek writes, "The means of production – agricultural and pastoral land and livestock, forests, mineral wealth, and industry – were nationalized or collectivized. The wealth of the religious establishment, especially considerable in Central Asia because of the Islamic institution of pious endowment, was confiscated, and its institutions – mosques, madrasas, and khangahs – were closed."

1924 saw the termination of all the preceding administrative entities and a complete rewriting of the map of Central Asia, on the basis of one ethnic group, one territory. The Soviet Union's constitution consolidated these divisions by transforming the empire into a union between the Soviet Socialist Federation of Russia and the Soviet Socialist Republics, within which could be included five autonomous republics, autonomous regions and national territories under the influence of Russian economic policy.

The Russian economic policies of World War I were replaced in 1921 by the more market-based New Economic Policy. The New Economic Policy was adopted when hyperinflation and forced confiscations led to peasant revolts, the collapse of grain supplies to the cities, urban unrest, and the Kronstadt Uprising of March 1921. When Stalin replaced the New Economic Policy in 1928 and 1929 by the command economy, which became Soviet-style central planning, he used the New Economic Policy's failure to justify the need for drastic change. After 1921 agriculture, retail trade and small-scale industry were all decentralized,

operating in a market setting, while the state retained control of the large enterprises accounting for three-quarters of industrial output. The State Planning Committee drew up mandatory output plans for a few key industries, and organized the state order system. State control of the financial system enabled it to allocate capital and credit. Both agricultural and industrial output had surpassed 1913 levels by 1928. In 1929 compulsory quotas replaced the market system for agricultural output, which was soon replaced by agricultural collectivization and central planning. This development strategy decision created the model of a centrally planned economy for the remainder of the Soviet era and became the blueprint for every other centrally planned economy in Central Asia.

Economic growth in the 1930s was rapid by historical standards, but concentrated in heavy industry as agricultural output initially declined and only recovered to 1928 levels by late in the 1930s. Stalin believed that collectivization and central planning was necessary to maintain Communist power in the face of peasant demands for political change and to direct output to heavy industry, which would produce the equipment crucial to military success against Japan in 1938–39 and most vitally against the German invasion in 1941, during World War II. In the 1950s the peacetime economy was generally seen as successful. The USSR achieved high levels of basic needs provision, and appeared to be on the technological frontier when Yuri Gagarin became the first man in space in 1961. Consumption levels recovered from the extremely low levels of the 1940s when mass starvation occurred during the war years. Between 1950 and 1965, the urban housing stock doubled. Infant mortality rates fell from 182 per thousand live births in 1940 to 81 in 1950 and 27 in 1965, and other health indicators also improved markedly. Primary education became universal, and the number of pupils aged 14–17 increased from 1.8 million in the 1950–51 school year to 12.7 million in 1965–66, while higher education enrolments increased from 1.25 to 3.8 million over the same period. What the world did not see at the time was the tremendous sacrifices called upon the peoples of Central Asia in the name of the modernization of Russia.

During the 1950s and 1960s the Soviet Union's exploitation of Central Asia not only went on unchecked, but in certain respects it reached, what Soucek called, "monstrous proportions." The classic colonial pattern of hauling away raw materials in return for finished products acquired here a degree and forms never imposed by Western powers on their colonies. Moscow turned Central Asia into a mega-farm designed to produce ever greater quantities of cotton. To this end irrigation kept being expanded beyond the capacity of Central Asian rivers, the soil exhausted by monoculture kept being saturated with chemical fertilizers, the crops sprayed by clouds of pesticides and herbicides, and instead of fully mechanizing the production, cheap native labor was routinely used for harvesting the cotton. A grim feature of this cheap labor was schoolchildren, driven to the unhealthy fields in the fall instead of studying in classrooms. The policy of cotton monoculture became pronounced in the 1930s, but it was especially from the 1960s to the 1980s that it reached its height.

The Soviet political system and the pursuit of rigid command-style economic planning were the main causes of environmental degradation in Central Asia. The strong centralization of the political structures and decision-making procedures created a giant physical and cognitive gap between the Politburo in Moscow and the conditions of everyday life in the provinces. The subservient political culture of the local party elite contributed to this, as did the practices of the communist bureaucracy. There were no independent political and legal institutions able or willing to control or correct unsound policies. Furthermore, the impact of soil erosion, salinity increase, decreasing water supply and the pollution of water and soil due to the intensive application of pesticides were disregarded. The increased production reinforced the image of never-ending economic and social progress in the Soviet republics of Central Asia. The threats to human security in each of the five former Russian countries are quite different than the image that was projected by Moscow. No country was to emerge

from Soviet rule unscathed. A brief examination of the environment concerns of each country is enlightening.

The most urgent environmental concerns involving threats to human security in Kazakhstan are centered on water, radiation and waste. The Aral Sea represents a unique disaster with a sequence of devastating environmental and socio-economic effects, but water supply and quality are of concern throughout Kazakhstan. Radiation derives from large geological uranium deposits and waste from uranium mining as well as the use of Kazakhstan for military nuclear testing by the Soviet Union. Natural radioactivity is two to three times higher than the global average and the radioactive and toxic pollution associated with former defense industries and test ranges based throughout the country still poses long-term health risks. The province of Semipalatinsk in eastern Kazakhstan was chosen as the area for Soviet nuclear experiments, but neither the testing nor the damage it caused to the health of the people were even mentionable before the dawn of *glasnost* and *perestroika*. The testing has ceased, but its consequences are still very much there. Moreover, it appears that other parts of Central Asia were used as dumping grounds of toxic waste. One such site apparently was in the vicinity of Chirchik, a town some thirty kilometers to the northeast of Tashkent.

As an Aral Sea state, Kazakhstan is one of the immediate victims of the environmental devastation and collapse of the Sea's ecosystem, which derived from the shrinking of the Sea to almost half its original size due to a reduction in average annual discharge. The third major environmental concern for human security derives from large amounts of industrial wastes and inappropriate waste management. By 1998, accumulated hazardous industrial wastes amounted to almost 3 billion tons, according to the United Nations Global Development Network. Industry is located mainly in the east of Kazakhstan, where many of its rich natural resources can be found. Improper waste disposal and the large quantity of hazardous wastes pose a substantial risk of contaminating surface and groundwater by heavy metals.

Political, religious, and cultural oppression aside, perhaps the first evidence of damage to the peoples of Central Asia can be traced to the famine that plagued Turkestan and Kazakhstan during the harsh winter of 1918 and 1919. Estimates vary on the number of people that died between one and three million people. These deaths were not altogether unwelcome by the Bolshevik leadership in Moscow. The dead could be replaced with Russian settlers. Soucek writes that since the establishment of Soviet power, Russian land ownership has increased in the Semireche province of Kyrgyzstan, for example, from 35% to 70%, while the number of the Kyrgyz who have perished is estimated at 35.5%.

The nomadic herders of Kazakhstan had seen much of their grazing space reduced by the influx of Russian settlers in the Tsarist era, but in the early years of the Soviet rule they still occupied considerable tracts in the country's center and east. At the end of the 1920s and beginning of the 1930s the Soviet government launched forced collectivization of their herds and imposed the transition from nomadic life to permanent, year-round settlements. The nomads met this campaign with resistance, often destroying their livestock and the ensuing famine in turn decimated the Kazakhs' population by at lease one million. By the late 1930s, the percentage of the Kazakhs in their own republic fell to 29 percent. The vacated or sparsely populated territories became that much more inviting for future influx of settlers, which culminated in the celebrated "virgin land" campaign launched by Khrushchev in the late 1950s and early 1960s.

In only 30 years, the Karakalpaks have witnessed the drying up of the lake on which they had subsisted for decades. Although the Aral Sea was always saline, it supported a

productive fishery. As the Soviet authorities withdrew water upstream for irrigation, the sea rapidly dried out. With less water discharging into the Aral Sea, salinity increased from 10 grams per liter to more than 30. Many of the native fish were unable to adapt to the rising salinity. As a result, commercial fishing came to a halt in the early 1980s. In 1959, the fishing boats and trawlers that now reside in the sand of the exposed seabed hauled in nearly 50,000 metric tons of fish (mostly carp, bream, pike-perch, roach, barbel, and a local species of sturgeon), but by 1994 the few fishermen that remained retrieved a mere 5000 metric tons of carp. In order to keep the canneries operating and provide some form of economic sustenance for the affected local population, the authorities flew in fish from as far away as the Baltic Sea and the Pacific Ocean. In short, under Soviet rule unprecedented amounts of water were diverted from the rivers to expand cotton monoculture and to reclaim new lands for agricultural production. These withdrawals for irrigation drastically altered the water balance in the Aral. The sea receded by 60–80 kilometers.
To this day, both Kazakhstan's manufacturing and agricultural sectors are severely constrained by huge debts, dilapidated equipment, formidable export obstacles, and poor environmental conditions.

The most significant environmental problems threatening human development and security in Kyrgyzstan are centered on irrigation for agriculture, and large-scale gold and uranium mining. This has led to the disruption of fragile ecosystems mainly in mountainous regions and cattle grazing areas, diminishing the livelihoods of the rural population in remote areas. The mining of uranium, heavy metals and mercury and the storage of past mining wastes have also become key environmental problems. Additional environmental pressure results from soil contamination from agricultural practices. Mainly in the remote mountainous areas, poverty and lack of income alternatives force local communities to engage in intensive cattle grazing, which contribute to deforestation and degradation of fragile natural habitats.

The major environmental problems of Tajikistan are the impacts of increasing land degradation, and limited availability of clean drinking water, all of which are mutually reinforcing. The Tajik Aluminum Plant, Tadaz, in Tursunzande is one of the largest smelters in the former Soviet Union and is located only 10km from Uzbekistan's south-eastern border. The emissions are heavily polluting the area around Tursunzande as well as the Uzbek administrative divisions of Kashkadarya and Surkhandarya, contaminating soils and crops as well as livestock. Most of Tajikistan's environmental problems are related to the agricultural policies imposed on the country during the Soviet period. By 1991 heavy use of mineral fertilizers and agricultural chemicals was a major cause of pollution in the republic. Among those chemicals were DDT, banned by international convention, and several defoliants and herbicides.

In addition to the damage they have done to the air, land, and water, the chemicals have contaminated the cottonseeds whose oil is used widely for cooking. Cotton farmers and their families are at particular risk from the overuse of agricultural chemicals, both from direct physical contact in the field and from the use of the branches of cotton plants at home for fuel. All of these toxic sources are believed to contribute to a high incidence of maternal and child mortality and birth defects. According to the United Nations Global Development Network in 1994 the infant mortality rate was 43.2 per 1,000 births, the second highest rate among former Soviet republics. The rate in 1990 had been 40.0 infant deaths per 1,000 births. Cotton requires particularly intense irrigation. In Tajikistan's cotton-growing regions, farms were established in large, semiarid tracts and in tracts reclaimed from the desert, but cotton's growing season is summer, when the region receives virtually no rainfall. The 50 percent increase in cotton cultivation mandated by Soviet and post-Soviet agricultural planners between 1964 and 1994 consequently overtaxed the regional water supply. Poorly

designed irrigation networks led to massive runoff, which increased soil salinity and carried toxic agricultural chemicals downstream to other fields, the Aral Sea, and populated areas of the region.

Turkmenistan's problems are related to natural habitat transformation, biodiversity loss, soil erosion and salinity increase, use of rivers for irrigation and human activities, water and soil and, pollution by pesticides. The building of dams has also contributed to environmental degradation in recent years. The depletion of Turkmenistan's biodiversity is occurring in connection with human-induced desertification of oases and mountain landscapes. Environmental degradation is boosted in connection with dropping groundwater levels and water losses from the Kara-Kum canal due to increased irrigation for urban and industrial use. Overuse of fertilizers and pesticides for agricultural crops have led indirectly to health impacts upon the population. Domestic and industrial wastewater is discharged to the deserts, affecting groundwater locally. Agricultural drainage water, which is discharged to rivers without control, has increased the levels of minerals, phenols, pesticides and other chemicals in water bodies. As a result, the rivers have reached dangerously high concentrations of salts and chemicals, especially in lower areas. Drinking water quality is therefore a major problem in many regions of Turkmenistan. The local population in the Dashkhovuz province south of the Aral Sea has suffered from hepatitis and intestinal diseases due to polluted drinking water and the region has been declared by a presidential decree as an ecological disaster zone. The water scarcity has an immediate influence on the natural environment and human living conditions and a secondary impact on agricultural productivity.

Uzbekistan’s main environmental problems are centered on water and agriculture. Besides the Aral Sea, Uzbekistan struggles with water supply and contamination problems throughout the country and the whole region. The agricultural heritage makes land deterioration and contamination Uzbekistan’s second largest problem for human security. The Aral Sea catastrophe dates back to decisions taken by the Soviet Union in the 1960s, when every effort was made to increase cotton production, mainly by increasing irrigation. The necessary water was tapped from rivers that feed the Aral Sea. This Soviet water management had a series of catastrophic environmental effects, which bear heavily on the region and most immediately affect the autonomous Republic of Karakalpakstan.

By the 1980s, nearly 90 percent of water use in Central Asia was for agriculture. Of that quantity, nearly 75 percent came from the Amu Darya and the Syrdariya, the chief tributaries of the Aral Sea on the Kazakhstan-Uzbekistan border to the northwest of Tajikistan. As the desiccation of the Aral Sea came to international attention in the 1980s, water-use policy became a contentious issue between Soviet republics such as Tajikistan, where the main rivers rise, and those farther downstream, including Uzbekistan. By the end of the Soviet era, the central government had relinquished central control of water-use policy for Central Asia, but the republics had not agreed on an allocation policy.

In the pursuit of increased agricultural production, hazardous levels of pesticides and chemicals are used, and the increasing salinity of the water resulting from inefficient irrigation techniques damages the soil and decreases its fertility. Polluted water is also a primary cause of increasing levels of water-spread diseases, such as cholera and tuberculosis. Furthermore, the environmental degradation caused by agricultural practices has also had a direct impact on the economy, as can be seen in the relative decline in output from the cotton fields. Overall, water management is the most pressing environmental issue in the Central Asia, and probably the most difficult to solve. Another problem that impacts the regions ability to mitigate the environmental challenges is the very nature of the economies left by the Soviet state.

At the time of the breakup of the USSR, the five states of Central Asia shared many cultural, structural, and institutional similarities. The states had similar and in some cases common cultural traditions and shared the Russian language. All the states had the same communist management legacy. All the states had specialists trained in similar intellectual traditions and bureaucracies accustomed to working in similar ways. All the states had economies specialized to the production of primary commodities.

While there were important similarities among the states, there were also important differences. The states were quite different in terms of their national resource endowments, connections to foreign markets, and government strategies. For instance, agriculture makes up a large proportion of employment in all the Central Asian states but makes a strikingly different contribution to the overall gross domestic product in the states. In Kazakhstan, Turkmenistan, and Tajikistan, for instance, agriculture was responsible for less than 10 percent of the country's Gross Domestic Product (GDP). Yet in Kyrgyzstan agriculture made up more half of the country's GDP. In Uzbekistan agriculture made up 31 percent of the country's GDP and farm employment played a major role in the economy.

Another important factor differentiating the countries was their export dependencies. All the countries had substantial dependence on a particular commodity or group of commodities; gas in Turkmenistan, oil and metals in Kazakhstan, cotton in Uzbekistan and Tajikistan. Commodity-dependent export economies are quite common in the developing world. There are many examples of oil-exporting and single crop economies that reflect the dominance of a particular sector or cluster of sectors. Yet in Central Asia there were many cases in which the country's dependence was upon a small cluster of producers. For instance, nearly 40 percent of Tajikistan's GDP came from a single factory, the Tursunzade aluminum factory. With so much of the each country's economy dependent on a particular commodity, the region's ability to significantly impact the environmental problems without destroying their economy in the process remains a challenge.

At the time of independence in 1991, the Caucasian and Central Asian states encountered a variety of economic challenges. The fall of the Soviet Union had been preceded by a decade of poor economic performance affecting all aspects of life in that country. The Soviet economy began to experience major problems in the 1960s, which became worse in the 1970s and 1980s. In particular, the state-dominated economy was in deep trouble in the last decade of the Soviet Union, and this provided the economic ground for its fall. The depth of the economic problems and their clear worsening trend forced the Soviet leaders to express concern about the situation, thus breaking with their traditional policy of denying that any problems existed in their country or in its satellites.

Environmental issues became the focal point for political opposition in Russia during the 1980s. To a large extent, this was as a reaction to President Mikhail Gorbachev's *glasnost* policy, which created an opportunity for limited criticism of the Soviet authorities. The Chernobyl nuclear accident in 1986 was a pivotal incident. The authorities' decision to withhold relevant information reinforced the impression of a paralyzed regime unable to take sufficient measures to protect the environment. The demand for information increased, mobilizing people at a local level to push for changes in environmental policies, and eventually within the political system itself. By far the most serious environmental problems created in Central Asia during the Soviet period stemmed from water utilization. Inefficient irrigation systems use excessive amounts of water, which drains the region's water resources.

For all the repression they brought, the Soviets also carried out progressive reforms, in the availability of mass education and health care, the growth of industry, the development of

mechanized methods of farming and irrigation, and the creation of a communications infrastructure that was fully integrated with Russia. Of course, the point of these improvements was to enable Central Asia's produce, raw materials, and minerals to flow to Russia. Central Asia thus became a colony for Russian industry and, later, for its excess population, as millions of Russians were forcibly resettled in Central Asia to farm the land and run the factories.

The dissolution of the Soviet Union broke up the old Soviet pattern of production and trade, and the new national customs arrangements and protectionism of the independent states prevented trade form developing. Russia remained the largest trading partner of Kazakhstan, Kyrgyzstan and Tajikistan but on a lower level than before. Parallel to this, Central Asian trade with Asian and Western countries increased. Russia continues to be a player in Central Asia with its monopoly of the pipeline system for oil and gas exports.

Industrialization in Russia demanded huge and continuing sacrifice on the part of the people of Central Asia. Industrialization also required sacrifice on the part of the ecology of Central Asia. Perhaps no where in the Soviet Union was this sacrifice made in relative obscurity as it was in Central Asia. Almost overnight, Uzbekistan, Kazakhstan, Kyrgyzstan, Tajikistan, and Turkmenistan began to attract considerable attention from politicians, journalists, businessmen, and academicians. The reason was the collapse of the Soviet Union in 1991. Since the formation of that Union in the early 1920s, this group of five countries had been almost sequestered by the rulers of the Soviet empire. The outside world was barred from unhindered access and communications with them, and their own citizens found contact within that world both difficult and risky. With the opening of Central Asia to the rest of the world came a gradual realization of the ecological damage caused to the region by Russian rule between 1928 and the collapse in 1991. The damage inflicted upon Central Asia by Soviet industrialization and modernization was momentous. The needs of the Soviet government between 1928 and its collapse in 1991 outweighed any consideration of the ecological damage done to Central Asia. The region became an ecological disaster were the effects will surely be felt for many years to come.

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