Central Asia: regional security and WMD proliferation threats

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All countries of Central Asia—Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan—inherited elements of the vast Soviet weapons of mass destruction (WMD) production complex. Among the activities in which WMD facilities in Central Asia were engaged were uranium mining, plutonium production, the fabrication and testing of biological and chemical weapons, and the storage and testing of nuclear weapons. Early international efforts to address this proliferation threat emphasized ensuring that the Russian Federation became the only legatee of Soviet nuclear weapons; other proliferation risks posed by WMD materials, technology and expertise received less attention.

Materials that currently pose WMD-related threats in Central Asia can be classified into three main groups: nuclear weapon-related material, including fissile material (highly enriched uranium and plutonium) and radioactive material ("orphan", or abandoned, sources); biological weapon-related materials and technologies; and chemical weapon-related materials and technologies. The leading WMD-related risk in Central Asia is the possibility of the theft of materials and their sale by smugglers or through brokers to terrorist or proliferant states. Another risk is the leakage of expertise either through the sale of critical information or through "brain drain". A related risk is the possibility that Central Asian states could be used as a transit corridor for smuggling WMD-related materials and expertise originating from outside of the region.

This paper discusses the fragile security environment in Central Asia post-2001, the greatest proliferation risks in the region, and details some of the national, regional and international responses.

A new security environment in Central Asia after 2001

The 11 September 2001 terrorist attacks in the United States had direct and indirect effects on every country in the world. In Central Asia, the developments were particularly decisive because of the United States-led military campaigns in Afghanistan (2001) and Iraq (2003). The military operation in Afghanistan has been especially significant as the geographical proximity of Afghanistan to the Central Asian states and political, religious, social and economic factors all make the region dependent on stability in its neighbour.

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Although the overthrow of the Taliban regime in Afghanistan promised a generally positive impact on developments in the region, it has not been a panacea; serious problems in the reconstruction and political stabilization of Afghanistan remain and have the potential to destabilize the already fragile regimes in Central Asia. Some observers within Central Asia are disappointed in the failure of the United States' engagement to have a positive influence on regional security.[1] The fact that the Taliban movement has not been eradicated completely—that, although considerably weakened, it still exhibits signs of life in some parts of Afghanistan and neighbouring Pakistan—is a matter of concern both for Central Asia and for the wider international community.

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Radical Islamist sentiment in the region has escalated against a background of growing anti-Americanism since the US-led operation in Afghanistan (and later in Iraq), which has been exploited by fundamentalist movements. The Islamic Movement of Uzbekistan (IMU), whose stated goal since 1999 has been the overthrow of the government of Uzbek president Islam Karimov and its replacement with a caliphate, was considerably weakened in the immediate aftermath of the war in Afghanistan in 2001, but since December 2002 has carried out some terrorist acts in the region.[2] The IMU has also expanded its goal to include the whole of Central Asia and the Muslim-populated part of China (Xinjiang), and in 2001 renamed itself the Islamic Movement of Turkestan (IMT).[3] Reports indicate that IMU/IMT guerrillas have operated with Al-Qaeda and Taliban units.[4] If true, this indicates a worrying trend of radical Islamist movements from within Central Asia linking with international terrorist organizations. Another source of concern for Central Asian states is the activities of Hizb-ut-Tahrir in the region (most active in Tajikistan and Kyrgyzstan).

The true extent of Islamist revival in Central Asia is a question of debate, but its presence is indisputable. While the post-Soviet revival of fundamentalist Islam in Central Asia can be partly attributed to factors such as political oppression, economic hardship and social problems, increased foreign involvement in Afghanistan has also played a part. Overall, the impact of fundamentalist Islam in Central Asia and beyond is often exaggerated from one extreme to the other by different political groups seeking to achieve a variety of goals. Some fear that Central Asian governments (all of which are, to varying degrees, authoritarian regimes) sometimes use the pretext of counter-terrorism to crack down on internal dissent.

A related challenge to regional stability is posed by drug trafficking from Afghanistan into Central Asia and Europe. In 2007 Afghanistan cultivated 193,000 hectares of opium poppies and produced 8,200 tons of opium, thus reaching a position of disturbing "leadership" on the world opium market (Afghanistan is the world's near-exclusive supplier of the drug, with 93% of the global opiates market).[5] It is widely recognized that drug smuggling is closely linked to insurgency, finances most of the radical Islamist groups like the Taliban, and spreads corruption among warlords and sometimes even government officials. Moreover, smuggling routes are often used not just for drugs, but also for bringing terrorists across borders.[6] Such extremely porous borders and still far from ideal export control systems make the region susceptible to illicit smuggling of WMD-related material and expertise, potentially either originating from Central Asian countries or passing though them.

The third major consequence of the 2001 attacks and the subsequent military operation in Afghanistan has been the emergence of new geopolitical pressures in Central Asia. Initially, Kyrgyzstan and Uzbekistan allowed US military forces to use their military and air bases in support of the operation in Afghanistan, and Kazakhstan agreed to allow US military aircraft to use its airports for emergency landings. These decisions resulted in closer strategic military and political cooperation between these Central Asian states and the United States.

The geopolitical context for US–Uzbek relations, however, changed significantly after 2005. In May of that year in the Uzbek town of Andijon (Fergana Valley), thousands protested against the growing poverty, corruption and repression of people who practise Islam outside of the tight restrictions on religion established by the Uzbek government.[7] Hundreds were reportedly killed by law enforcement officers. The Uzbek government has denied any wrongdoing and has stated that the protests were organized by Islamic fundamentalists. The US government criticized Tashkent for what looked like a bloody reprisal against dissenting people by an authoritarian regime.[8] Tashkent, stung by Western criticism, kicked US troops out of the Karshi-Khanabad base and appears to have turned to China and the Russian Federation for strategic partnership.

Although Central Asia had traditionally been in Russia's sphere of security interests, the long-term presence of US military bases in the region has significantly altered the degree of Russian influence. Nonetheless, Russia—and China—are not ready to give up on the idea of exercising significant influence in Central Asia. The shifting geopolitical paradigm (e.g. Uzbekistan swinging between a strategic partnership with the United States on the one hand and with Russia and China on the other; the unpredictable and shifting Kyrgyz–Russian and Kyrgyz–US relationship; and Kazakhstan's "multi-vector" foreign policy of manoeuvring between the interests of major powers) demonstrates that great powers are continuing their struggle for dominance in the region, while Central Asian states continue to depend on these powers in terms of providing for their own security. None of this provides a good foundation for a predictable and stable security environment in the region.

The long-term impact of the 2001 terrorist attacks on the United States, the anti-Taliban military campaign in Afghanistan, and the 2003 war in Iraq on geopolitics in Central Asia remains to be seen. The long-term implications for regional security continue to evolve. On the one hand, the removal of the Taliban in Afghanistan certainly contributed to regional stability in the long run. The active involvement of the United States in Central Asia—shaped by its interest in the region's political and economic stability—has also had a positive impact. At the same time, these very factors are potentially disruptive. The presence of US bases in Central Asia, potential political unrest, the ongoing economic and social crises in neighbouring Afghanistan, and the geopolitical redistribution of power among the traditional key players from outside the region could all contribute to instability in Central Asia.

Current WMD proliferation threats

Nuclear and radioactive material

The continued presence of fissile and radioactive material in the countries of Central Asia poses a persistent proliferation risk. Obtaining fissile material such as highly enriched uranium (HEU) or plutonium is one of the most important steps separating terrorists from a nuclear device of very destructive power, while acquiring certain types of radioactive material is the principal hurdle to creating a radiation dispersal device (RDD) or "dirty bomb". Central Asia is a potential source for both types of material.

HEU remains at several sites in Central Asia. Kazakhstan has three HEU-fuelled research reactors,[9] and its overall amount of HEU is believed to be about 10,590–10,940kg.[10] The Mangyshlak Atomic Energy Combine (MAEK) in Aktau, Kazakhstan, is the site of the BN-350 fast breeder reactor, which produced plutonium prior to being shut down in 1999.[11] To date, 2,900kg of HEU fuel from BN-350 have been removed to the fuel processing facility in Ust-Kamenogorsk and blended down to low-enriched uranium (LEU);[12] the remaining material at the facility includes spent fuel that contains some three tons of better than weapon-grade plutonium.[13] While this material is packed in special casks and stored at MAEK's storage pool, reducing the risks of theft,[14] spent fuel constitutes a proliferation

risk due to its high plutonium component; it will be better secured only by being removed from the facility completely and placed in long-term storage.[15] Concerns about security are partly driven by Aktau's location on the shore of the Caspian Sea. The United States Department of Energy (DOE) assists Kazakhstan with providing long-term storage. In its most recent budget request (for fiscal year 2008), the DOE is asking for US$ 31.7 million for this purpose. It is planned that all BN-350 spent fuel will be moved to the Baikal waste site (at Semipalatinsk) by 2010.[16]

Uzbekistan has one operating HEU-fuelled research reactor.[17] In 2004 the United States repatriated 11kg of fresh HEU fuel assemblies from Tashkent to the Russian Federation, and in April 2006 63kg of spent HEU fuel were transported to the Mayak facility in Russia. Uzbekistan now has less than 56kg of HEU (all of which is irradiated fuel), and has committed to converting its only operating reactor to LEU.[18]

Lax accounting for fissile material during the Soviet era provides grounds for concern that not all the fissile material in Central Asia may be accounted for. The Soviet system encouraged facility managers to manipulate production figures, even those involving fissile material. The nuclear facilities would produce extra uranium or plutonium without registering it as insurance against a possible shortfall in future production.[19] There can be no guarantee that the region is clear of all fissile material, although there is no evidence of significant amounts of unaccounted material in Central Asia.

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Another potential proliferation threat in Central Asia is the significant number of "orphan" radiation sources. These are sources abandoned by medical, scientific and industrial users who are either unable or unwilling to dispose of them properly, leaving them vulnerable to theft. Some of these sources could be used in unsophisticated radiological devices. It is also possible that sources could be stolen from industrial, medical or research facilities currently in use. According to the chairman of the Kazakhstan Atomic Energy Committee, Timur Zhantikin, and based on Soviet-era data, about 100,000 radiation sources were present in Kazakhstan in 1992. In 2005, Kazakh government officials admitted that they were unaware of the whereabouts of at least 20,000 radiation sources still believed to be in the country.[20] That same year it was announced that Kazakhstan would start a nationwide inventory of radioactive sources used by industrial enterprises and institutions, as well as search for orphan radioactive sources. It is believed that this process is under way. Also in 2005, and despite domestic instability in the aftermath of the "Tulip Revolution", Kyrgyzstan managed to conduct a partial search for lost or abandoned radioactive sources. About 1,000 items of radioactive material deemed to be vulnerable to theft or terrorism were secured or disposed of by October 2005. According to Kyrgyz authorities, there were 500 additional items to secure, and an unidentified amount of radioactive material was still missing.[21]

A study of the safety of commercial radioactive sources concluded that only a small fraction of such sources present a proliferation risk.[22] Therefore, the risk posed by radioactive sources should not be exaggerated. The main challenge for the Central Asian states regarding these sources is the lack of comprehensive inventory information, which would make it possible to determine how many potentially dangerous radiation sources are in each country, and how many are currently unaccounted for. During the Soviet era, not all radioactive sources in the Central Asian republics were registered with local government officials (e.g. radioactive sources used by the military and thus controlled by the federal authorities in Moscow were not covered by local registration requirements). In addition, under a project known as "Gamma Kolos", radiation sources containing caesium-137 (an isotope suitable for a radioactive device) were sent to Kyrgyzstan, Turkmenistan and possibly other Central Asian republics for use in agricultural experiments. Officials from the International Atomic Energy Agency (IAEA) believe that 100–1,000 of these sources are unaccounted for in the former Soviet Union, and that some of them are probably in Central Asia.[23]

Numerous organizations and facilities that ceased to exist in the chaotic aftermath of the Soviet collapse are sites of currently unaccounted radioactive sources. Many of these organizations simply abandoned radiation sources as they deserted the facilities. The privatization of formerly state-owned enterprises in the region has also contributed to the problem of lost radioactive sources—many were not properly transferred to the new owners.[24]

Biological components

Four main biological-weapon proliferation threats exist in Central Asia.

Vozrozhdeniye Island in the Aral Sea, divided between Kazakhstan and Uzbekistan, was used during the Soviet era to fabricate and test biological weapons (BW). Buried caches of anthrax spores on the Uzbek side of the island were decontaminated and at present, scientists in Kazakhstan and Uzbekistan conduct disease surveillance campaigns on the island and check for plague and other diseases. The scientists fear that other pathogens tested on the island during Soviet times might still be there and could spread to the mainland through rodents.[25] The United States is currently discussing possible cooperative projects with Uzbekistan to characterize the pathogens circulating among the fauna in the Aral Sea.[26]

Remaining micro-organisms on Vozrozhdeniye Island pose a potential proliferation risk because of the shrinkage of the Aral Sea and the increasing proximity of the island to the mainland. The potential for birds and rodents to carry diseases to the mainland, and the possibility of people who come to the island in search of scrap metal becoming carriers of disease are both causes for concern.

Collections of strains, pathogens and micro-organisms remain at bioresearch facilities throughout the territory of Central Asia, such as the Scientific Center for Quarantine and Zoonotic Diseases (formerly the Anti-Plague Institute) and the Scientific Research Agricultural Institute in Kazakhstan, and the Institute of Virology and the Tashkent Center for Prophylaxis and Quarantine of Most Hazardous Infections in Uzbekistan. These collections are vulnerable to theft. For example, there have been several documented attempts to gain access to Kazakhstan's Center for Quarantine and Zoonotic Diseases.[27]

Although security at these facilities has improved significantly and the US government provides funding to consolidate the number of facilities housing especially dangerous pathogens, risk persists. Apart from the above-mentioned main facilities there remains a wide network of laboratories from the Soviet era belonging to the Sanitary Epidemiological Services, of scientific centres and institutes working under the auspices of the Ministries of Health and Agriculture, and of smaller field stations of the former anti-plague network, which all work with highly dangerous infectious agents, field strains and museum cultures. These facilities are a potential source of BW agents for terrorists or proliferant states.[28]

Beyond collections and research, *natural foci of especially dangerous diseases,* such as bubonic plague, tulaeremia, Crimean-Congo hemorrhagic fever, anthrax and others are found throughout Central Asia. While at first the presence of such diseases might seem to be only a public health issue, potential proliferation risks are associated with these agents. The existence of natural foci of highly infectious diseases calls for research on vaccines and on means of epidemic prevention, which in turn requires research facilities to have extensive collections of strains and pathogens. The presence of such collections is a matter of concern if they are not properly protected. In theory, an experienced microbiologist could isolate the plague bacterium from infected humans or rodents and attempt to transform it into a biological weapon or could isolate a virulent (disease-causing) strain of anthrax bacterium from infected animals and humans and cultivate it; however, significant technical challenges would make it extremely difficult to achieve this goal.[29]

There are a number of scientists in Central Asia with *chemical and biological expertise*, which could be turned to weapon production. This potential threat is amplified by the slow conversion of BW-related facilities. For example, the US-sponsored dismantlement of the world's largest anthrax bioweapon production facility in Stepnogorsk (Kazakhstan) was implemented successfully and ahead of schedule, but bilateral Kazakhstan–US conversion projects aimed at establishing a drug packaging line in Stepnogorsk did not have the same degree of success.[30] The reason behind the failure was the non-performance of the US contractor chosen to do the job; the US Department of Defense (DOD) had to terminate its contract with this contractor in 1997. In the same year Congress prohibited the use of the DOD's Cooperative Threat Reduction funding for any further defence conversion projects.[31] In recent years two US-administered programmes[32] have begun to include bioscientists, but the number of scientists engaged is relatively small.

Chemical weapons threats

Chemical weapons (CW) were developed, tested and stored in various parts of Central Asia. The Chemical Research Institute situated in Nukus (Uzbekistan) was a part of the Soviet CW programme, and Ustyurt Plateau (Uzbekistan) was used for testing chemical defence equipment in hot weather conditions. In June 2002, US military forces stationed in Uzbekistan to support operations in Afghanistan announced that they had detected traces of nerve and mustard gas at Karshi-Khanabad air base. Prior to this episode, the presence of CW agents at Karshi-Khanabad was unknown. It is unlikely that any recoverable agents were involved or that there was any proliferation risk in this particular case. However, such cases indicate that a full account of the legacy of the Soviet-era chemical weapons programme is still lacking.

During the Soviet era, a part of Kazakhstan's Pavlodar Chemical Plant was designated for CW production, yet never entered into operation. When independent Kazakhstan acceded to the Chemical Weapons Convention (CWC) the government did not need to declare the plant since the production of chemical weapons never took place.[33] Since Soviet times, some of the production equipment has been sold off. The main proliferation threat at the plant concerns some specialized equipment such as high-nickel-steel production reactors, which are well suited for manufacturing highly toxic and corrosive metals and whose fate is unclear.

The primary CW proliferation concerns in Central Asia relate to dual-use chemicals (a concern that is not unique to Central Asia) and the factor of the "unknown" (e.g. the possibility that there may be equipment or material of proliferation concern that has not so far been located). As a result of this legacy, Central Asia remains a possible (albeit not likely) source of CW-related materials, technology and expertise.

Confronting the threats

Since the break-up of the Soviet Union, a number of steps have been taken by the Central Asian governments and the international community to address the region's WMD legacy. These measures can be analysed on three levels: national, regional and international.

National responses

The national responses of Central Asian countries to WMD threats consist of the domestic measures the states have taken to secure WMD-related material and technology, prevent the "brain drain" of specialists with WMD expertise, and limit the potential illegal export of material and expertise from and through their territories.

One aspect of the national response involves decisions about joining the treaties and agreements that form the basis of the international non-proliferation regime. All five Central Asian states have joined the Treaty on the Non-proliferation of Nuclear Weapons (NPT) as non-nuclear-weapon states. They have also all signed the Comprehensive Nuclear-Test-Ban Treaty (CTBT), the Chemical Weapons Convention and the Biological and Toxin Weapons Convention (BTWC). In addition, all five states have signed not only IAEA Safeguards Agreements but also Additional Protocols committing them to even more intrusive and comprehensive IAEA verification measures.

The efforts of the five states to establish a sound national export control system have had mixed results. Overall, the Central Asian governments are continuing to develop the necessary legislation and to design and implement measures to strengthen export control systems, though the current level of control in Kyrgyzstan, Tajikistan and Turkmenistan remains weak—much more can and should be done. The Central Asian states have not been able to commit sufficient human and financial resources to this task, whether because of a genuine lack of resources or insufficient political commitment.

United Nations Security Council resolution 1540, adopted in 2004, requires that all states put in place and enforce effective accounting and physical protection measures, as well as border and export controls, to prevent trafficking of WMD and related materials. It recognizes that national governments are responsible for establishing effective domestic controls, but also acknowledges that some states may require assistance with implementation, and invites states in a position to provide such assistance to do so. An example of such assistance in Central Asia includes workshops organized by the James Martin Center for Nonproliferation Studies in Kazakhstan in 2006 (funded by the Norwegian Foreign Ministry and the MacArthur Foundation) and in Kyrgyzstan in 2007 (funded by the Norwegian Foreign Ministry and Carnegie Corporation of New York), aimed specifically at implementation of resolution 1540 in these countries.[34]

In terms of specific national challenges, Kazakhstan's main non-proliferation goal in the early 1990s was to remove nuclear weapons from its territory, which was accomplished in April 1995. As a capstone to these efforts, Kazakhstan signed (1996) and ratified (2001) the CTBT, putting an end to the long history of nuclear tests on its territory. The country is now concerned with securing its remaining nuclear material, providing adequate physical protection for nuclear and biological research facilities, recovering and securing orphaned radioactive sources, and preventing the natural spread of extremely dangerous diseases. Among the Central Asian states, Kazakhstan has the most developed export control system and is the only state to belong to one of the international export control regimes (the Nuclear Suppliers Group). However, even in Kazakhstan there is still considerable room for improvement.[35]

Uzbekistan's main non-proliferation goal is also to secure or dismantle its Soviet WMD inheritance. Uzbekistan has HEU and LEU at an operational nuclear research reactor near Tashkent and it continues to produce uranium at Navoi Mining and Metallurgy Combine. The country also inherited two former BW facilities, where security has been improved.

By contrast, Kyrgyzstan does not currently have important WMD-related facilities. Its main challenge is its geographic location, which makes it a potential transit route for WMD-related materials and technology. Kyrgyzstan is in vital need of strong export controls and a strengthened border control system. It is working on improving its border control, but its capabilities remain underdeveloped.[36]

Tajikistan has a uranium milling plant (and may once have had an enrichment facility) at the Vostochnyi Rare Metal Industrial Association (Vostokredmet) in Chkalovsk; it also has a plant in Taboshar that used to manufacture solid-propellant rocket motors for Soviet strategic missiles.[37] So it faces the task of adequately securing the materials and technology at those sites. Like all the other Central Asian states, Tajikistan also has unaccounted "orphan" radioactive sources on its territory. Tajikistan's location requires an improvement in the existing export control system, currently characterized as very weak.[38]

In 1997 Tajikistan adopted a Law on Export Control., but its difficult economic situation means that Tajikistan has to rely on foreign states for assistance.

Turkmenistan has no WMD-related infrastructure or materials on its territory, apart from a reported abandoned uranium mine in the north-west of the country.[39] Its priority goal should be the development of export controls, as its export control system seems to be the weakest in the whole former Soviet Union.[40] Turkmenistan is the only Central Asian state that does not have a law on export control. Some presidential decrees were adopted that outlined goods that required licence for import or export. However, they were considered to be export control decrees but not non-proliferation export decrees (since their primary goal was to protect Turkmenistan's domestic market by controlling the flow of items in and out of the country).

Regional efforts

In addition to individual national efforts, there have been some region-wide non-proliferation endeavours. In 2006 the five Central Asian states established a nuclear-weapon-free zone (NWFZ), which reiterated their adherence to non-proliferation values. By establishing a NWFZ the states agreed to ban nuclear weapons from the region and accepted stricter safeguards to prevent proliferation.[41]

International cooperation

International involvement has been an important catalyst for national efforts to address proliferation threats in Central Asia. The main source of external assistance is the United States, as the US government has been concerned with potential WMD proliferation in the former Soviet Union since the early 1990s. US-funded cooperative non-proliferation programmes are financed by the US Departments of Defense, State, Energy and Commerce, as well as some other government agencies. These programmes originated under the legislation passed by US Senators Richard Lugar and Sam Nunn in 1991. Countries other than the United States also provide substantial resources to assist Central Asia; major contributors include Canada, Japan, the United Kingdom and other EU countries.

With assistance from the Cooperative Threat Reduction (CTR) programme, Kazakhstan removed all nuclear weapons and intercontinental ballistic missiles from its territory and destroyed all the silos associated with these weapons. CTR also helped shut down the former nuclear test site at Semipalatinsk and financed the dismantlement of the BW facility in Stepnogorsk (both in Kazakhstan) and the CW research facility in Nukus (Uzbekistan). The CTR programme provided funds for projects to establish a new laboratory complex for anti-plague research at the Kazakh Scientific Center for Quarantine and Zoonotic Diseases. CTR funds also paid for improved safety and security in the Scientific Research Institute in Otar (Kazakhstan), and in three bioresearch institutes in Uzbekistan (the Institute of Virology, the Center for Prophylaxis and Quarantine of Most Hazardous Infections and the Samarkand Veterinary Institute).[42] The CTR programme provides opportunities for bioscientists to work on biosafety and biosecurity projects as well. For example, Kazakh scientists mapped and completed the genetic fingerprinting of 93 isolates of anthrax found in Kazakhstan. Also, they were able to participate in a joint diagnosis of avian influenza in Georgia and Kazakhstan and diagnosed and identified the source of an outbreak of Congo-Crimean hemorrhagic fever (a tick, in Uzbekistan).[43]

Vozrozhdeniye Island has been partly decontaminated thanks to financial and technical assistance. The United States provided Uzbekistan with US$ 6 million to dismantle former BW infrastructure and disinfect Uzbekistan's part of the island.

Kazakhstan's government asked the United States for assistance in the early 1990s when almost 600kg of inadequately secured HEU fuel was discovered at the Ulba Metallurgical Plant in

Ust-Kamenogorsk. This amount was reportedly enough to build 20–25 nuclear bombs.[44] In 1994 the HEU fuel was removed to a safe location in the United States.[45]

Several non-proliferation assistance programmes are helping Central Asia with the development of regulatory frameworks for export control and providing training and equipment for export control officials, border guards and customs inspectors. For example, the US State Department, Customs Service and Department of Commerce have been active in providing assistance through seminars, workshops and training for Central Asian specialists in order to enhance the countries' export and border control capabilities.

The International Science and Technology Center (ISTC), an international organization financed by Canada, the European Union, Japan, Norway, the Republic of Korea and the United States, provides employment to former Soviet weapons specialists who seek to turn their skills to civilian use. While initially the ISTC focused on employing former nuclear scientists, with time it has recognized the need to provide alternative employment to BW and CW experts. The ISTC provides grants for peaceful research projects, thus reducing the potential threat of experts selling critical knowledge. Its activities in Central Asia should be expanded even further to help prevent the leakage of WMD know-how from the region. The Science and Technology Center in Ukraine (STCU) funded by the EU, the United States and Canada, an organization identical in structure and function to the ISTC, is also dealing with this issue. At present, Kazakhstan, Kyrgyzstan and Tajikistan are parties to the ISTC, and Uzbekistan is a member of the STCU. The Global Initiatives for Proliferation Prevention (GIPP) programme, administered by the US Department of Energy, is also aimed at preventing "brain drain" from the former Soviet republics by engaging scientists in collaborative commercially viable projects.[46]

An important contribution to government-led efforts is being made by the non-profit Nuclear Threat Initiative (NTI, co-chaired by former US Senator Sam Nunn and media magnate Ted Turner). For example, NTI is helping Kazakhstan with the elimination of HEU stockpiles by assisting with blend-down of HEU and by supporting conversion for the Alatau nuclear research reactor.

Conclusion

The geopolitical situation in Central Asia remains unstable. In addition, there are insecure WMD-related materials located in the region and areas of terrorist activity can be found nearby. Overall, the geopolitical conditions in modern Central Asia together with the Soviet WMD legacy in the region create a dangerous combination of security risks and threats to Central Asia itself and the world.

The geopolitical conditions in modern Central Asia together with the Soviet WMD legacy in the region create a dangerous combination of security risks.

The WMD proliferation threats in Central Asia thus require unfailing attention from both national governments and the international community. Although important work on reducing proliferation risks in the region has been completed in the last decade and a half, much remains to be done. It is critical that additional measures be taken. Sustained political and financial support is necessary if non-proliferation measures in the region are to be effective and durable.

The current three-layered response to existing WMD proliferation threats at national, regional and international levels is laudable but would benefit from additional commitment on behalf of the Central Asian states and international donors. The Central Asian republics are limited in how they can implement non-proliferation policies; a lack of financial and human resources is by far the biggest problem, although not the only one. At the regional level, the five Central Asian states have succeeded in reaching agreement on the creation of a NWFZ, but the urgency of current challenges suggests a need for greater cooperation, especially in the export and border control areas. At the level of international assistance programmes, significant achievements have been reached in terms

of reducing proliferation threats. More attention, however, needs to be paid to conversion and to the environmental and socio-economic needs of the Central Asian countries to complement the dismantlement of WMD infrastructures, if positive long-term results are to be achieved.

Notes

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24. Author's interview with Nysangali Kozhahmetov, Kazakh Republic Sanitary Epidemiological Station, Almaty, Kazakhstan, February 2003.
25. Sonia Ben Ouagrham-Gormley, Alexander Melikishvili and Raymond Zilinskas, forthcoming, *The Soviet Anti-Plague System: A Recent History 1992–2004,* James Martin Center for Nonproliferation Studies web site.
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27. See, for example, *Izvestiya,* 11 June 2002, no. 203 (26282), p. 7; and "Break-in Reported at a Biological Facility in Kazakhstan", *NIS Export Control Observer,* Center for Nonproliferation Studies, January 2003, at <cns.miis.edu/pubs/nisexcon/pdfs/ob_0301e.pdf>, p. 11.
28. Kenes Ospanov, "Organizatsiya meropriyatii po preduprezhdeniyu bioterrorizma", paper delivered at the Biological Weapons Nonproliferation Training Seminar, Center for Nonproliferation Studies, Almaty, Kazakhstan, 12–14 May 2003.
29. It is technically challenging to weaponize the plague bacterium; however, the Soviet bioweapons programme had developed a means to permit its spread as an aerosol and some former Soviet bioweapons scientists may still possess the necessary expertise. If any of these scientists could be recruited by a terrorist organization, the threat of converting plague into a weapon would be real. Anthrax is much easier to weaponize than plague, but producing it in the form of highly refined powder in large quantities and disseminating it over large areas are technically difficult processes. A terrorist group would probably require the expertise of skilled BW scientists to turn anthrax into weapons of mass casualty attack, although smaller-scale attacks, entailing less technical sophistication, can still have a significant psychological and economic impact (for example, the "anthrax" letters sent within the United States in 2001). (This description was provided to the author by Jonathan Tucker, James Martin Center for Nonproliferation Studies.)
30. "Bakteriologicheskoe oruzhie: vchera, segodnya, zavtra", *Delovaya Nedelya,* 11 February 2001.
31. Communication with a DOD official, 31 October 2007.
32. ISTC and Global Initiatives for Proliferation Prevention (GIPP). GIPP was previously called Initiatives for Proliferation Prevention. In 2006, it was expanded to include another programme—Nuclear Cities Initiative (NCI)—and to reflect broader geographical application (e.g. work with WMD scientists in Libya and Iraq). In mid-2006 the original agreement was not renewed and NCI ceased to exist.
33. Kazakhstan signed the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction on 14 January 1993. The Convention entered into force in Kazakhstan on 22 April 2000.
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40. "Turkmenistan: Export Control Developments", *Country Profiles,* Nuclear Threat Initiative (produced by James Martin Center for Nonproliferation Studies), May 2006, at <www.nti.org/e_research/profiles/Turkmenistan/index_5190.html>.
41. For a detailed review of the Central Asian NWFZ, see the article by Jozef Goldblat in this issue of *Disarmament Forum*.
42. Laura Schmidt, "Threat of Chemical Weapons and US Programs on Nonproliferation of Chemical and Biological Weapons", paper delivered at the Biological Weapons Nonproliferation Training Seminar, Center for Nonproliferation Studies, Almaty, Kazakhstan, 12–14 May 2003.
43. United States Department of Defense, 2006, *Cooperative Threat Reduction Annual Report to Congress Fiscal Year 2008,* at <www.dtra.mil/documents/oe/ctr/FY08%20CTR%20Annual%20Report%20to%20Congress.pdf>, p. 2.
44. The Kazakhs maintained that only 5% of the material was weapon-grade while the rest would require further enrichment. See "Kazakhstan Nuclear Facilities: Ulba Metallurgy Plant", *Country Profiles,* Nuclear Threat Initiative (produced by James Martin Center for Nonproliferation Studies), March 2007, at <www.nti.org/e_research/profiles/Kazakhstan/Nuclear/4278_4302.html>.
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