Although its nuclear and missile programs are frequently in the headlines, North Korea’s other weapons of mass destruction (WMD) programs and their role in Pyongyang’s security strategies draw less discussion and analysis.

Expanding analysis to include a consideration of North Korea’s chemical weapons capabilities allows for a better understanding of the doctrine around its unconventional weapons and thus for development of more tailored policies to deal with the WMD threats and risks they pose.

North Korea has never confirmed publicly that it maintains a chemical weapons stockpile, although the U.S. government and others have long assessed that Pyongyang has a variety of lethal chemical agents and related missile and artillery delivery systems. In 1989, Pyongyang signed the 1925 Geneva Protocol, which prohibits the use of chemical and biological weapons in warfare but does not ban production or stockpiling. North Korea signed that accord with reservations, outlining its right to dismiss the protocol in the case of another party that violates the use prohibition. North Korea has not joined the more comprehensive 1993 Chemical Weapons Convention (CWC), which extends the prohibition to include production and stockpiling.
In considering North Korea’s strategic drivers, three main elements are common throughout its history: deterrence and reunification, which are recognized as supporting the principal goal of protecting national sovereignty, and survival.¹ There has been much debate on the role of nuclear weapons in this context but much less focus on the role of chemical weapons.

By developing a long-range nuclear capability and maintaining regional WMD assets, Pyongyang is able to take advantage of a difference between the United States and South Korea in calculation of strategic risks. A key South Korean security concern, as it relates to North Korea, is the use of conventional and WMD capabilities with regional ranges. U.S. officials, as North Korea’s long-range missile program develops, will have an increasing interest in protecting the continental United States, which may include a lessened desire to retaliate on behalf of South Korea. Such a divergence of strategic interests could weaken the U.S.-South Korean alliance and thus reduce the adversarial risk to Pyongyang, a motivation for North Korea to pursue capabilities that can achieve this result.

North Korea’s strategic goals have also been shaped by founder Kim Il Sung’s vision of leadership over a unified Korea and the use of military force to achieve it.² This thinking is often used to understand the role of nuclear weapons under Kim Jong Un, the late Kim’s now-ruling grandson. Such a goal could be pursued through military actions or coercion under the shadow of nuclear weapons. Although the latter is not explicitly referenced in current North Korean discourse,³ it should not be assumed to be absent from the regime’s internal thinking.

Yet, the goal of reunification in the short term likely has declined. The same may be true of the long-term vision, although reunification remains imbedded in North Korea’s Constitution and the North Korean psyche. At the same time, given the economic and military buildup in South Korea and increased U.S. military presence in the region, the North’s worry about a potential territorial attack has increased, likely elevating deterrence for regime survival above reunification. This does not equate to a renunciation of reunification but does suggest a shift in strategic priorities, especially in the short to medium term, that prioritizes nuclear weapons.

The two overarching elements of North Korean strategic thinking—deterrence and reunification—are used to support the enduring goal of regime survival. Beyond repelling external efforts to remove the regime, it also encompasses the elimination of internal threats, economic development, and, secondarily, reunification.⁴ The three strategic priorities are interlinked; deterring adversaries helps preserve the regime, which is key for any possibility of reunification.

These strategic motivations have driven consecutive North Korean leaders to pursue asymmetric military assets. Given the great asymmetric value of nuclear weapons in relation to conventional
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military threats on the peninsula and the option of balancing perceived nuclear threats from the United States, these capabilities have visibly taken priority.

Understanding strategic goals in the context of North Korean priorities in the past, present, and future is important for understanding the role played by weapons of mass destruction. As the nuclear capability has advanced, it is worthwhile to consider what this means, if anything, for North Korea’s chemical weapons capabilities.

History of Chemical Weapons

Although North Korea’s chemical capabilities briefly hit the headlines in 2017 following the assassination of Kim Jong Nam, the estranged half-brother of Kim Jong Un, there has been concern for decades about North Korean chemical weapons efforts.

In 1961, Kim Il Sung’s “declaration of chemicalization” formally initiated a dual-use chemical industry in North Korea. This declaration came at a time when the North was attempting to recover from the Korean War, investing heavily in agricultural and industrial development, as well as seeking to expand military capabilities to support opportunities for reunification by force and to defend against similar attempts from the South. By 1979, a U.S. Defense Intelligence Agency assessment reported that North Korea had acquired a defensive chemical capability. This assessment coincided with a 1980 statement reportedly made by Kim Il Sung to the Korean Worker’s Party Central Military Committee that “poison gas” would be effective for use in combat, boasting that North Korea had “succeeded in producing poisonous gas and bacterial weapons through our own efforts supported by Soviet scientists in the field.” Information on how such activities have continued to evolve is sparse. Assessments relating to the North’s chemical weapons stockpile suggest that Pyongyang has developed chemical capabilities across a spectrum—vesicants, nerve, cyanogen, and choking agents. Arguably the most publicly visible of these has been nerve agents, not only appearing in the Kim Jong Nam assassination but also featuring in Chinese media reports that suggested a detected leak of sarin. Defector testimonies have also included accounts of prisoners being victims of chemical testing. Such defector accounts should be read with caution in terms of reliability, but not disregarded.

Amid evidence that chemical weapons capability exists, stockpile estimates vary, with a range of 2,000 to 5,000 tons of agent. A 2009 report noted that there had been no indication of growing storage facilities that would be necessary in the case of an expanding chemical arsenal and estimated that 2,000 to 3,000 tons of agent would be sufficient to significantly impact a war with the South. The South Korean Ministry of National Defense has cited similar stockpile estimates since 2008, with a relatively consistent but broad range of 2,500 to 5,000 tons of agent. It is widely assumed that North Korea can deliver chemical weapons via a range of systems, including artillery, multiple rocket launchers, ballistic missiles, and aircraft.

Although there is little doubt that North Korea has produced chemical weapons, a comprehensive and public understanding of the current condition of inventories and infrastructure is limited, with some analysts citing the capability as aging and rudimentary.

In his 2015 New Year’s address, Kim Jong Un highlighted the chemical industry as an area of potential for North Korean growth and independence. In 2017 and 2018, he referenced the chemical industry as successful and expanding. Given the dual-use nature of chemical production, assessing the facilities for weapons production through open sources is challenging.

There is a widespread belief that North Korea was behind the 2017 assassination of Kim Jong Nam at a Malaysian airport by attackers using VX, an extremely potent nerve agent. The nature of the attack challenges the assumption that North Korea is technically limited to producing rudimentary unitary munitions; two perpetrators used cloths to smear a substance on Kim Jong Nam’s face. It is unclear whether both cloths contained the same substance, providing a double dose for increased lethality, but each cloth may have been dowsed with a corresponding binary agent. (With a binary agent, the two components become lethal only when combined.)
Nerve agents are especially sensitive to impurities and thus prone to instability. The higher the quality, the more stable and thus the longer the shelf life. Applying this to the Kim Jong Nam case, the agent used was produced relatively recently or was of a high quality. Either of these possibilities would refute claims that North Korea only possesses degraded or rudimentary chemical capabilities.

A recent U.S. Department of Defense report on North Korea states that although the investigation of the assassination is ongoing, evidence supporting North Korea’s role would demonstrate that North Korea has a chemical weapons stockpile from a long-standing chemical weapons program. This case alone cannot confirm whether this agent was syphoned from a military-scale program or stockpile or was produced in a small quantity for this specific act. The agent used may not have been produced via the same program that supports a broader military chemical weapons development. The assassination was likely orchestrated by special operations personnel, potentially requiring separate production of the nerve agent in a small quantity.

Role of Chemical Weapons

Despite the focus on the nuclear weapons program to strengthen deterrence and support regime survival, chemical weapons likely continue to have value for the Kim regime. Historically, chemical weapons most likely filled a deterrence gap prior to the development of an adequate nuclear capability. Some scholars have observed that the threat of U.S. nuclear use in the Korean War helped drive the desire for a chemical capability: although acquisition of nuclear weapons was probably a long-term aspiration for Kim Il Sung, chemical weapons were recognized as a weapon of mass destruction that could provide deterrence as well.

With the Korean War still very much in recent memory, Kim Il Sung focused on bolstering the military capabilities necessary for reunification of the peninsula. There have been allegations that the United States during the war used biochemical weapons against the North. To be able at least to respond in kind to such capabilities in any future military conflict, the Kim Il Sung regime believed it would need to develop WMD capabilities to successfully reunify the peninsula. With the military alliance of the United States and South Korea developing at a rate that North Korea could not match conventionally, chemical weapons could have provided an appropriate asymmetric capability less costly than nuclear weapons and that could be developed quickly with help from allies such as the Soviet Union, China, and East Germany.

A key change came in the early 1990s, following the U.S. Operation Desert Storm against Iraq. Pyongyang likely concluded from observing that event that chemical weapons could not sufficiently deter U.S. military intervention, something only a nuclear arsenal could achieve. This shift has resulted in nuclear weapons becoming North Korea’s main tool of deterrence today.

Still, chemical weapons have not become redundant or irrelevant for North Korean deterrence or its strategic thinking more broadly. Such weapons contribute to asymmetric capabilities, especially early in a conflict where a move to nuclear weapons use might be too rapid an escalation, but asymmetric tactics are required for defensive protection or offensive gain.

It has been Kim Jong Un’s intention to strengthen the asymmetric strategy of North Korea, and chemical weapons continue to act as a conventional-force multiplier. Chemical weapons likely would be used to hinder the movement in war of the adversary’s conventional land forces. Despite much superior conventional strength, South Korean and U.S. armed forces would be hindered for three reasons. First, chemical weapons use could deny or delay access to key areas crucial for the forward movement of on-peninsula forces, as well as to key ports needed for incoming support. Second, it would slow hostile forces by forcing them to operate in chemical protection suits. Third, it would add complexity to the military engagement because it would be impossible to distinguish between incoming conventional and chemical warheads.

The deterrence role of chemical weapons persists given the uncertainty about North Korea’s military capabilities. The ambiguity can play to North Korea’s favor by complicating an adversary’s calculus. Chemical weapons continue to back up North Korea’s conventional capabilities and underpin the nuclear deterrent through increasing the risks associated with military action to overthrow the
regime. By complicating how a military scenario on the Korean peninsula could play out, chemical weapons increase the risks associated with military action and contribute to calculus against this option, thus assisting in the preservation of the regime.

Further, chemical weapons have a role for the regime in sustaining international relationships and revenue generation. Maintaining a chemical program allows North Korea to retain marketable proliferation skills and assets. A recent notable example was the 2016 visit of a North Korean technical delegation to Syria. The visit included the transfer of special resistance valves and thermometers that are known for use in chemical weapons programs. 13

Although this is likely a secondary benefit of chemical weapons capabilities, it brings added value and justification for maintaining chemical weapons even as the nuclear program has grown. Proliferation of chemical weapons-related equipment and know-how will continue to be a valuable asset for North Korea, particularly if the international norms against use of such weapons continue to erode, as seen in Syria.

Despite recent diplomatic developments, North Korea has not moved formally to rollback its nuclear capability. The prospect of complete North Korean nuclear disarmament seems implausible. For North Korea’s leadership, chemical weapons alone do not have a strong enough deterrent value to provide assurance of regime survival. Nuclear weapons have not made a military chemical weapons capability redundant; a military chemical weapons program will likely continue to be maintained at least as an insurance policy against attack by superior conventional forces.

Asymmetric Advantages

Arms control discussions that focus on just one of these capabilities might not be able to lead to the removal of other types of weapons of mass destruction. Given the differing but complimentary roles of chemical and nuclear capabilities, approaching North Korea with the idea of limiting or removing these capabilities together, as some U.S. officials have proposed, 20 likely would not produce fruitful results. An approach to remove both or signal an intent to remove one and then the other without significant shifts in the security context would make North Korea reluctant to engage.

Even if the current dialogue around the nuclear program can produce tangible results in at least capping the nuclear program, the opportunity for including chemical weapons will be low. North Korea has consistently maintained that it does not possess a chemical weapons program and to shift to a position of acknowledgment and a willingness to limit these capabilities will only be possible with a dramatic shift in the security environment in which North Korea sees itself and as part of a much longer-term strategy.

To limit the threat from the possession of chemical weapons in the more immediate term, policymakers must focus on two main areas. First, a priority should be to continue to engage with North Korea to reduce hostilities, thus weakening the potential for military action on the peninsula. This is where risk reduction of chemical and nuclear weapons indirectly ties together. It is widely acknowledged that any conflict on the Korean peninsula would be devastating, but inclusion of chemical weapons use would have broad implications for the international nonuse norms that have been built since the opening for signature of the CWC. Making sure the nonuse norm does not have another arena for degradation will be vital.

Second, the international community should work to ensure the chemical norm does not further erode outside of the Korean peninsula and should attempt to restore it in light of events in Syria. Getting Pyongyang to agree and explicitly commit to no onward proliferation for chemical weapons is unlikely. If the premise is accepted that much of North Korea’s onward proliferation is driven economically at least in part, reinstating the norm against chemical weapons could help reduce the risks of North Korea’s chemical program by stemming the demand side of the equation. Recent initiatives to expand the scope of investigations by the Organisation for the Prohibition of Chemical Weapons should be the start of the normative shift back toward nonuse.


5. “North Korea’s Chemical and Biological Weapons Programs,” *Asia Report*, No. 167 (June 18, 2009), p. 5.


7. “North Korea’s Chemical and Biological Weapons Programs,” p. 6.

8. Ibid., pp. 5–6. The germ weapons reference here refers to North Korea’s biological weapons program, although this capability is not being covered here.


13. “North Korea’s Chemical and Biological Weapons Programs,” p. 7.

14. Although these estimates explicitly refer to chemical weapons stockpiles, the information may be skewed by the inclusion of biochemical capabilities.


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