Conclusion

These are the primary conclusions of our assessment of North Korea's nuclear, chemical and biological weapons programmes, its ballistic missile programme and the conventional balance of forces on the Korean Peninsula.

Nuclear

Compared to other weapons programmes, North Korea's nuclear weapons efforts have received the lion's share of intelligence scrutiny and attention, especially by the US, which views nuclear proliferation as its highest priority issue with North Korea. Because of this attention, and IAEA inspections of several key facilities, more is known about North Korea's nuclear capabilities than its other weapons programmes, but many uncertainties remain. The two key questions affecting an evaluation of North Korea's nuclear weapons capabilities are: how much weapons-usable nuclear material (separated plutonium or highly enriched uranium) does North Korea have on hand and how much can it produce in the future; and is North Korea able to design and fabricate deliverable nuclear weapons with this fissile material?

- It is plausible that North Korea was able to produce enough plutonium before 1992 for one or possibly two nuclear weapons.

This judgement is based on a mixture of technical and motivational factors. Firstly, there is strong technical evidence of discrepancies between IAEA samples taken at the Yongbyon reprocessing facility and samples of the small amount of plutonium declared by Pyongyang in 1992, suggesting that North Korea actually separated more plutonium before 1992 than it declared to the IAEA. However, the amount of additional plutonium cannot be determined by these sampling discrepancies. Secondly, in theory, North Korea could have operated its Soviet-supplied IRT reactor and the 5MW(e) graphite-moderated reactor before 1992 to produce additional undeclared spent fuel containing a maximum of 8–12 kilograms of plutonium. In theory, this is enough plutonium for one or possibly two early generation implosion-type nuclear weapons, taking into consideration expected reprocessing losses (10–30%) and the amount of plutonium typically required for a simple fission weapon (5–8kg). Thirdly, the fact that North Korea sought to conceal suspect nuclear waste sites before and during the IAEA inspections in 1992 and then ran the risk of provoking an international crisis by refusing to allow access to these sites – which could have resolved questions about its pre-1992 plutonium production – suggests that Pyongyang was hiding something of value. Finally, it is plausible that having invested considerable time and resources to build indigenous plutonium production facilities, Pyongyang would try to get some strategic benefit from its investment before turning the facilities over to IAEA inspection. In this scenario, Pyongyang's mistake was getting caught.

Despite the plausibility of this judgement, it may be wrong. There is no conclusive proof of how much plutonium North Korea actually produced and separated prior to 1992. The amount could be considerably less than the theoretical maximum of 8–12kg. Perhaps Pyongyang salted away a much smaller amount of plutonium – maybe a few kilograms – and planned to add to this cache by secretly diverting small amounts of fresh plutonium produced under IAEA safeguards, until it built up enough for a nuclear arsenal. In this scenario, North Korea's objective in the 1993–94 nuclear crisis was to preserve strategic ambiguity. As long as Washington believed that North Korea could have enough plutonium for one or two nuclear weapons – an assessment that was made public at the time – Pyongyang would achieve some degree of nuclear deterrence. Strategic ambiguity was maintained under the Agreed Framework, which froze additional plutonium production, but allowed North Korea to retain a presumed nuclear capacity for a period of years before it was required to account for this material.

- Aside from plutonium produced prior to 1992, North Korea clearly has enough additional plutonium on hand for a few nuclear weapons. Its ability to produce fresh plutonium over the next several years is limited, but could substantially expand by the end of the decade.

North Korea's most important strategic asset is the plutonium contained in nearly 8,000 spent fuel rods discharged from the 5MW(e) reactor in June 1994. The exact amount of plutonium contained in these fuel rods is unknown, but the IAEA estimates they contain about 25–30kg of plutonium – which is a reasonable estimate. Assuming that 10–30% of this plutonium is lost in reprocessing and assuming that 5–8kg of plutonium is required for a simple implosion weapon, this is enough for two to five nuclear weapons. Since North Korea broke the nuclear freeze in late 2002, the status of these rods – and the plutonium contained within – is unknown. North Korea claims that it began to reprocess the fuel in April 2003 and finished the job in July 2003 – a time frame consistent with the technical parameters of the reprocessing facility. During this period, satellite intelligence and environmental sampling detected indications that some reprocessing had begun, but the available information cannot verify North Korea's claim that it completed the work. Certainly, it is plausible that Pyongyang would take advantage of the 2003 Iraq War to extract the

plutonium, while US military resources were occupied elsewhere, but it is also possible that North Korea ran into technical difficulties or that private warnings from Washington and Beijing halted the operation in mid-stream. Assuming that some or all of the rods have been reprocessed, it is not possible to determine what has become of the extracted plutonium without on-site inspection. Extracted plutonium could be fabricated into nuclear weapon components, a process involving melting, casting and machining plutonium metal to form a spherical core. Or, North Korea could retain the plutonium in raw form (either as an oxide or metal), threatening to fabricate weapon components if concessions are not forthcoming.

Aside from the plutonium in the 8,000 spent fuel rods, North Korea's ability to produce fresh plutonium in the near term is limited. Operating at maximum power for 300 days a year, the 5MW(e) reactor is theoretically capable of producing 7.5kg of plutonium annually, enough for about one nuclear weapon, assuming a 10–30% reprocessing loss and 5–8kg of plutonium per weapon. Given its poor operating history, however, and the fact that it has been mothballed for nearly a decade, the reactor may have experienced start-up problems since North Korea declared that it had resumed operations in February 2003. Thus, assuming enough plutonium for one or two nuclear weapons separated before 1992 and enough plutonium for two to five nuclear weapons in existing spent fuel, as well as about one additional bomb's worth of plutonium produced by the 5MW(e) reactor annually, North Korea's maximum potential nuclear arsenal over the next several years is likely to be around half a dozen to a dozen nuclear weapons – if no new facilities to produce plutonium or highly enriched uranium come online. (This estimate assumes no access to foreign sources of weapons-usable nuclear materials.)

In the longer term, North Korea's ability to produce significantly larger quantities of plutonium depends on finishing the 50MW(e) reactor, which was thought to be one to two years from completion at the time of the 1994 freeze. However, the status of key pieces of equipment for the reactor has never been determined, and it is not known whether enough graphite or fuel was produced prior to the freeze to outfit the reactor. Fuel fabrication could be a bottleneck because parts of the existing fuel fabrication plant at Yongbyon are heavily corroded and would need to be rebuilt before fuel fabrication could resume. Assuming no major technical problems, the 50MW(e) reactor could probably be completed, tested and brought up to high power operations in a few years at the earliest, although the end of the decade is a more cautious prediction. If Pyongyang makes a political decision to complete the reactor, large-scale activity at the facility would be liable to detection by satellite intelligence resources. There have been no public reports of such activity since North Korea announced, in December 2002, its intention to resume construction of the reactor. In theory, operating at full power for 300 days per year, the 50MW(e) reactor could produce about 55kg of plutonium each year in its spent fuel, enough for about 5–10 nuclear weapons – depending on reprocessing losses and the amount of plutonium required for each weapon of North Korean design. The much larger 200MW(e) reactor was not close to completion in 1994 and has suffered from poor maintenance during the freeze. It is many years away from completion, at best.

- There is convincing evidence that North Korea has embarked on a clandestine enrichment programme, but not enough information to determine with confidence the programme's status and when it might be completed.

The June 2002 US assessment that North Korea is seeking to develop a gas centrifuge plant capable of enriching enough weapons-grade uranium for 'two or more nuclear weapons a year' is based on several pieces of evidence. Firstly, there were indications that Pakistan provided centrifuge technology to North Korea in exchange for *No-dong* missiles in the late 1990s. While not conclusive, the evidence was plausible. Pakistan was presumably interested in obtaining 'off-the-shelf' intermediate-range missiles capable of delivering nuclear payloads, a task for which the *No-dong* is well-suited. Meanwhile, North Korea was presumably interested in obtaining an alternative to plutonium production to maintain its nuclear hedge, since the Agreed Framework would have required North Korea eventually to declare its plutonium stocks and dismantle its plutonium production facilities. Disclosures that Pakistani scientists may have sold centrifuge technology to Iran and Libya increases the plausibility of a bargain with North Korea over missiles for nuclear technology. Secondly, according to press reports, South Korea and the US obtained information in 2001 about the centrifuge programme from a North Korean source, said to be a defector with some knowledge of the programme. From public information, it is impossible to make an independent judgement of the reliability of this source, but the information was apparently considered credible enough by US and South Korean intelligence agencies to be taken seriously.

Thirdly – and perhaps most convincing – North Korean procurement attempts strongly point to an effort to acquire materials and equipment for a production-scale centrifuge plant. Some of this information is public, most notably the April 2003 interdiction of a shipment of 22 tonnes of high-strength aluminium tubes – the first installment of a 200 tonne

order. The particular type of aluminium and the dimensions of the tubes (unlike the tubes that Iraq was trying to acquire before the 2003 war) closely match the requirements for rotor casings for known centrifuge designs – in this case a type of centrifuge known to be in Pakistan's possession. Allowing for processing losses, the 200 tonnes of tubes could theoretically be used in the manufacture of about 3,500 of these centrifuge machines, enough to produce about 75kg of weapons-grade uranium a year or roughly three nuclear weapons of a first generation uranium-based implosion design (assuming 20–25kg per weapon). There is, apparently, additional information on procurement activities that has not been made public. For American officials, Vice Minister Kang's 'admission' to Secretary Kelly in October 2003 served to reinforce their conclusion that North Korea had an enrichment programme. Since then, North Korea has said that Kang was 'misunderstood' and has denied that it has an enrichment programme. However, the US conclusion is not based on the statements of North Korean officials one way or the other.

Publicly, the US estimates that a production-scale centrifuge facility 'could be operational as soon as mid-decade.' However, it is difficult to reach a confident assessment because many key factors are unknown, such as: the extent of the assistance provided by Pakistan; whether North Korea has been able to obtain all of the equipment and materials necessary to complete such a facility; the extent to which it can produce such items indigenously; and, most importantly, the location and status of the centrifuge plant and ancillary facilities. Of course, if all goes well, it is possible that the plant 'could' be finished by mid-decade, but plant completion and operation could also be delayed by interdiction efforts, such as the April 2003 tube seizure, and technical difficulties typically experienced by centrifuge programmes. From publicly available information, it is not possible to make a firm judgement.

- Assuming that it has sufficient fissile materials, it is plausible that North Korea could design and fabricate a simple implosion device, based on either plutonium or highly enriched uranium. But there is not enough information to reach firm conclusions about the details of such a weapon and how the North Koreans could deliver such a payload.

Given North Korea's long history of nuclear-related high-explosive testing, which began in the mid-1980s and continues through to the present, it is reasonable to assume that North Korea has been able to master the technology for a simple implosion device by now – the basics of the technology are widely known. North Korea is thought to possess the necessary skills in fields such as physics, electronics, munitions production and metallurgy, to design and fabricate such a device. Moreover, high-explosive testing – with surrogate materials in place of a fissile core – can be used to develop a reliable design without the need for a full nuclear test. Based on these considerations, Russian and US intelligence agencies have, since the early to mid-1990s, assessed that North Korea is capable of building 'simple fission-type' nuclear weapons without the need to conduct nuclear tests. This judgement has become more confident over time. The political assumption is that North Korea would build a bomb if it could. Certainly, Pyongyang wants the outside world to believe that it has such weapons.

The technical details of a presumed North Korean nuclear weapon are unknown. Physics dictates that all simple implosion weapons share certain characteristics, but there are wide variations in overall size and weight. A key question is whether North Korea can build a nuclear weapon small and light enough to be delivered by the *No-dong* missile. Clearly, from Pyongyang's standpoint, it would be desirable to develop a nuclear warhead for the *No-dong* missile – which would be a more reliable and effective delivery system than aircraft and therefore enhance deterrence. In this regard, a critical factor yet to be determined is whether, or to what extent, Pakistan may have provided nuclear weapons design information or even weapons-grade uranium to North Korea as part of the missile-for-nuclear deal. Of course, it is not known whether North Korea actually has deliverable nuclear weapons, but it would be imprudent to assume that it does not.

Chemical and biological weapons

Compared to its nuclear programme, far less is known about North Korea's chemical and biological weapons (CBW) capabilities. In general, CBW programmes are more difficult for intelligence agencies to detect and monitor than nuclear programmes because of the nature of the technology and facilities involved. In contrast to North Korea's nuclear facilities at Yongbyon, North Korea's dual-use civilian chemical and biological infrastructure has never been subject to international inspection, much less the suspect facilities reportedly associated with chemical or biological weapons research, production and storage. The US has generally placed a higher priority on gathering and analysing information on North Korea's nuclear programme, with the result that fewer US intelligence resources have been devoted to CBW activities. South Korea, however, has seen the potential CBW threat as a more important intelligence priority, and its public government reports have included more detail than comparable reports from the US and Russia.

- North Korea has probably produced and stockpiled chemical weapons, although the amount and types

of agents that have been produced, the number and types of munitions that have been stockpiled, and the location of key research, production, and storage facilities cannot be determined with high confidence.

This assessment is heavily based on perceptions of North Korean capabilities and motivations. North Korea's large – but ageing – chemical industry is capable of producing a variety of traditional chemical weapons (CW) agents, although some imported precursors may be needed for nerve agent production. North Korea's munitions industry is capable of producing a variety of chemical weapons, such as chemical-filled artillery shells or warheads for rockets and missiles. Plausibly, Pyongyang would see the utility of chemical weapons as both a military asset for tactical battlefield use and as a strategic asset to threaten civilian casualties. Arguably, the perceived value of chemical weapons increased after the mid-1990s, when North Korea's plutonium production was frozen and its conventional forces continued to suffer from financial restrictions. North Korea denies that it has any chemical weapons, but has refused to join the Chemical Weapons Convention (CWC).

According to current South Korean official assessments, North Korea's CW programme consists of four research, eight production and seven storage sites for chemical weapons, with a stockpile of 2,500–5,000 tonnes of chemical and biological agents, including blister, nerve, choking and blood agents – as well as tear gas – which could be delivered by artillery, multiple rocket launchers, aerial bombs, FROG rockets, and *Scud* missiles. Washington currently assesses that Pyongyang can produce a range of chemical agents similar to those identified by Seoul, and estimates that North Korea possesses a 'sizeable stockpile' of these agents, which can be delivered by artillery, missiles, and aircraft, as well as Special Forces. US reports do not estimate a specific quantity of agent or munitions or discuss suspect or possible research, production, and storage sites associated with the CW programme. Prudently, US and South Korean officials assume that North Korea is prepared to use chemical weapons against military and civilian targets in a general conflict.

- There is general agreement that North Korea has conducted research and development on biological agents, but not enough information to conclude whether it has progressed to the level of agent production and weaponisation, although North Korea is most likely technically capable of both.

Compared to chemical weapons, even less is known about a possible biological weapons programme. Official US, Russian and South Korean government reports agree that North Korea has conducted research on a variety of biological weapons agents, including anthrax, cholera, plague and smallpox, but only official South Korean sources claim that North Korea has weaponised one or two biological agents. Official US and Russian sources characterise North Korea as *capable* of producing a variety of agents, without judging that North Korea has actually produced biological weapons. Given the dearth of information, it is impossible to make a firm judgement either way. Arguably, Pyongyang might view biological weapons as relatively less significant than chemical weapons, which have more utility on the battlefield, and even less significant than nuclear weapons, which are true weapons of mass destruction.

Ballistic missiles

Assessments of North Korea's deployed short- and medium-range missiles are more certain than estimates of its efforts to develop long-range missiles capable of attacking the US with nuclear weapons.

- North Korea has produced and deployed short-range *Scud* B/C missiles (known in North Korea as the *Hwasong*-5/6), which can reach targets throughout South Korea, and medium-range *No-dong* missiles, which can reach targets throughout Japan. The exact size, disposition, and armament of these missile forces are unknown.

There is no doubt that North Korea can produce a variety of single-stage, liquid-fuelled ballistic missiles, based on *Scud* technology. However, there is little public information on the location and capabilities of missile production facilities, beyond a handful of major facilities associated with research and development, assembly, and flight-testing. With its ageing industrial base, North Korean missile production appears to be partly dependent on imports of foreign materials, equipment and components, which makes it vulnerable to supply interruptions. There is also no doubt that North Korea has deployed *Hwasong*-5/6 and *No-dong* missile units, probably organised along the lines of Soviet-style launch battalions, with four to six mobile launchers per battalion. Conservatively, we estimate a deployed force of about 120 *Hwasong*-5/6 missiles and about 40 *No-dong* missiles, but these numbers are approximate and North Korea could deploy additional missile forces if necessary. Including missiles held in reserve, official US and South Korean reports estimate that North Korea's overall ballistic missile inventory includes over 500 *Scuds* of various types and a few hundred *No-dongs*. A number of different underground bunkers, shelters, hide positions and tunnels thought to be associated with deployed missiles forces have been identified.

Presumably, Pyongyang views its short- and medium-range missile forces as a military and political asset. Armed with high-explosive or CBW warheads, missiles could serve as long-range artillery to disrupt military communications and logistics in rear areas and interdict reinforcements. As a political tool, its missile forces give North Korea a more credible threat to attack cities in South Korea and Japan with conventional or unconventional warheads, hence reinforcing deterrence and discouraging Seoul or Tokyo from pursing policies that could increase the risk of conflict. In wartime, the actual effectiveness of North Korean missiles to strike military and civilian targets would be reduced by poor accuracy, vulnerability to pre-emption, attrition of missile launchers and crews, and missile defences. However, given the number of mobile missile launchers and the variety of hide positions, some missiles would likely be launched and penetrate current defences.

- As demonstrated by the August 1998 *Taepo-dong*-1 launch, North Korea has begun to pass technological hurdles to develop multiple-stage long-range missiles, but the status of this effort cannot be accurately determined, especially since North Korea has refrained from additional flight tests since 1998.

On 31 August 1998, North Korea launched a three-stage *Taepo-dong*-1 (or *Paektusan*-1 as it is known in North Korea) rocket in an attempt to place a small satellite into orbit. Stage separation was successful (a *No-dong* first stage, *Scud* second stage and solid rocket motor third stage), but the third stage exploded and destroyed the satellite. In a ballistic missile configuration, the *Taepo-dong*-1 would provide little military utility beyond that offered by the *No-dong*, in terms of it being able to deliver a nuclear warhead to medium ranges. A more credible intercontinental range system, thought to be under development, is the *Taepo-dong*-2 (TD-2), which consists of a first stage of four clustered *No-dong* engines and a second stage of a single stage *No-dong* engine. On paper, assuming maximum capabilities, the US estimates that a two-stage TD-2 could deliver a 'nuclear weapon-sized' payload to targets in the western US. With a solid rocket motor third stage, the TD-2 is theoretically capable of delivering a 'nuclear weapon-sized' payload anywhere in the US, although accuracy would be extremely poor with known North Korean capabilities. Since 1998, the US has estimated that the TD-2 'may' be ready for testing at any time, but North Korea has refrained from additional flight tests since it agreed to a moratorium on long-range missile tests in September 1999.

While the *Taepo-dong* failed to launch a satellite into space, it succeeded in starting a debate about the status of North Korea's efforts to develop long-range missiles, which became enmeshed in longstanding disputes over National Missile Defense and the ABM Treaty. In one view, North Korea is close to developing a missile capable of attacking American cities with a nuclear warhead, which Pyongyang desires in a bid to undermine the US security relationship with South Korea and Japan. In an opposing view, North Korea's long-range missile development programme faces substantial technological obstacles and is intended more for bargaining leverage than military deployment. Both are probably true – by developing greater missile capabilities, North Korea can increase the price for abandoning its programme, while being in a stronger position to test and deploy such systems if negotiations fail. In any event, determining the actual status of North Korea's long-range missile development programme is impossible. There is some evidence that development has continued, but without flight-testing, even Pyongyang cannot be certain how close it is to achieving a successful system.

- North Korea has long been the world's leading exporter of missiles and missile technology, but sales may be declining.

Since the late 1980s, as other potential suppliers withdrew from the market, North Korea has become the world's leading missile exporter. Over the years, North Korea has sold at least several hundred *Hwasong*-5/6 or *No-dong* missiles, as well as materials, equipment, components and production technology to a range of customers, including Egypt, Iran, Libya, Pakistan, Syria, the United Arab Emirates and Yemen. In exchange, North Korea obtained cash, oil, opportunities for offshore testing and, in the case of Pakistan, nuclear technology. In recent years, however, opportunities for missile sales may have tailed off. Some of North Korea's longstanding customers, such as Iran, have nearly achieved an independent production capability, reducing their need for North Korean imports and even presenting competition to North Korean sales. Other customers, such as Pakistan, Yemen, the UAE, Egypt and, most recently, Libya, have come under political pressure from Washington to sever their missile relationship with North Korea. In addition, Pyongyang has periodically exercised caution about proceeding with missile exports that it considers too politically explosive, such as its refusal to carry out a missile deal with Iraq on the eve of the 2003 war.

The balance of conventional forces

Over the years, the conventional military balance on the Peninsula has shifted against North Korea. US and South Korean forces have modernised and strengthened their military capabilities, while North Korea's forces suffer from economic deprivation,

obsolete equipment, poor maintenance and inadequate training. As a result, the credibility of North Korea's threat to invade South Korea using forward-deployed forces near the Demilitarised Zone (DMZ) has diminished. With superior air power and munitions, and fighting from prepared defensive positions, US and South Korean forces stand a good chance of stopping a North Korean offensive before it could capture Seoul. In the end, North Korea could not invade the South without inviting a fatal counter attack from the US and South Korea, supported by Japan.

At the same time, Pyongyang's conventional forces are sufficiently strong to make an allied invasion to overthrow North Korea's regime an extremely unattractive option. Even with outdated equipment, poor readiness and adverse living conditions, North Korean soldiers are seen as tough fighters. With its massed artillery near the DMZ, North Korea retains the ability to inflict heavy casualties and collateral damage on allied forces and civilians – North Korean forces may not be able to seize Seoul, but they can devastate it. In theory, US forces could carry out limited pre-emptive attacks to destroy known North Korean nuclear facilities and missile emplacements, but such an attack would be unlikely to destroy all secret facilities and hidden weapons, and would risk provoking North Korean retaliatory action that could trigger a catastrophic war. The possibility that North Korea has acquired nuclear, chemical and biological weapons makes the prospect of a general war even more difficult to contemplate. With its back against the wall, the North Korean regime might take desperate and even suicidal actions.

Addressing the North Korean challenge

Because military options are unattractive, diplomacy – backed by economic and political pressures and inducements – has been the preferred instrument to restrain and dismantle North Korea's capabilities. At the same time, diplomacy requires military backing. A strong US security alliance with South Korea and Japan, and efforts to enhance allied military capabilities – including the redeployment of US forces in South Korea, continuing modernisation of South Korean forces and development of theatre missile defences – weakens North Korea's ability to employ threats and intimidation as a diplomatic instrument. The possibility of a pre-emptive strike against North Korean strategic military assets is also a diplomatic instrument. To the extent that North Korea views such an attack as a credible danger – whatever the likelihood of such a move – Pyongyang will be more inclined to avoid escalation and make compromises for a diplomatic solution. Similarly, the threat of a military blockade to enforce economic sanctions and political isolation can make a diplomatic solution more attractive as an alternative.

Over the last 25 years, a variety of diplomatic efforts have been made to address the challenges posed by North Korea's weapons programmes. These efforts have succeeded in delaying or limiting North Korea's nuclear and missile capabilities, but they have not been able to stop or eliminate them. Responding to a mixture of pressure and inducements, North Korea acceded to the NPT in December 1985 and eventually accepted IAEA inspection of its nuclear facilities and materials in April 1992. In March 1993, after refusing to cooperate with the IAEA to verify its past plutonium production, North Korea threatened to withdraw from the NPT. Other efforts were also underway during this time. In December 1991, Pyongyang and Seoul were able to conclude a broad bilateral agreement calling for a nuclear-free Korean Peninsula, only to see the agreement founder on disagreements over the frequency and intensity of inspections needed to verify rhetorical commitments. The North–South agreement remained a dead letter until it was formally renounced by Pyongyang in May 2003.

Bilateral agreements between the US and North Korea proved somewhat more effective. After North Korea threatened to withdraw from the NPT in March 1993, Washington and Pyongyang signed the Agreed Framework in October 1994. The Agreed Framework called for North Korea to freeze and eventually dismantle its plutonium production facilities and account for its plutonium stocks in exchange for interim supplies of heavy fuel oil, an alternative nuclear energy project and better relations with the US. In September 1999, the US succeeded in securing North Korean agreement to a moratorium on long-range missile tests. But the Clinton administration ran out of time to negotiate a broader agreement to freeze missile development, dismantle North Korea's existing missile force and end missile exports. The incoming Bush administration decided to pursue a 'broad agenda' seeking a comprehensive resolution of missile and other issues simultaneously rather than a stand-alone missile deal.

The Agreed Framework inhibited additional plutonium production by North Korea for nearly a decade, but it did not prevent North Korea from seeking to acquire nuclear weapons using other means. The Agreed Framework collapsed following public revelations in October 2002 that North Korea was pursuing a secret programme to produce weapons-grade uranium. In the diplomatic confrontation that followed, North Korea revived its plutonium production facilities in December 2002 and withdrew from the NPT in January 2003. It has most likely extracted some or all of the plutonium it has on hand in spent fuel – enough for a few nuclear weapons – and it has restarted the 5MW(e) reactor to produce additional plutonium. Since the collapse of the Agreed Framework, Washington has favoured multilateral

diplomacy over bilateral efforts and now promotes the Six Party Talks (involving the US, Russia, China, Japan, and North and South Korea) – which have as their aim the securing of a broad-based settlement under which Pyongyang would abandon its nuclear weapons programme for security assurances and political and economic benefits.

Inevitably, the record of fitful and failed diplomacy towards North Korea over the past 25 years has taken a toll. Among all the parties involved, it has fed fatigue, suspicion and hostility. Nonetheless, the key parties remain publicly committed to dialogue and efforts to achieve a peaceful solution. The strategic challenges posed by North Korea's various weapons programmes and the implications for international and regional security are too great to be ignored or treated with passive resignation. Firstly, an unrestrained and increasingly advanced North Korean nuclear programme would deal a significant blow to the international non-proliferation regime, with North Korea setting a precedent for leaving the NPT that might be followed by others in the region and worldwide. Secondly, as North Korea's nuclear assets expand, it would make more plausible and immediate the risk that North Korean materials and capabilities could, by accident or design, find their way to unstable and hostile states or non-state actors. Thirdly, North Korea's possession of a significant nuclear force and development of long-range missile forces could undermine the basis for deterrence on the Korean Peninsula and substantially increase the military risks attending any fundamental miscalculations by Pyongyang. Finally, North Korea's weapons programmes are an increasing source of tension in East Asia – a dynamic and strategically unsettled region. As Pyongyang's nuclear efforts gather momentum and grow more visible, the likelihood will increase that countries in the region will feel the need to alter their defence and security postures to prepare for any North Korean contingency. Given the historical mutual suspicions that pervade relations among the region's major powers, essentially defensive steps are likely to detract from, rather than enhance, regional security.

Because the stakes are so high, and because other options are less attractive, diplomatic efforts are likely to continue – despite the attendant frustrations and the difficulties. The Six Party Talks face a number of very complex and contentious issues that could affect the substance of any new agreement: including the sequence and timing of coordinated steps by the different parties; the extent and type of measures necessary to verify any new agreement; and the political and economic benefits that will be provided to North Korea in exchange for disarmament. A dramatic breakthrough to resolve these issues does not appear imminent, but a continuation of the talks – as well as the intense bilateral diplomacy surrounding the formal meetings – can begin incremental progress towards a resolution of these many complex and difficult issues, a necessary move if a final agreement to address the challenges of North Korea's weapons programmes is to be reached. Finally, success in the Six Party Talks could have the additional benefit of laying the foundations for a nascent multilateral security mechanism in East Asia that would help to support peace and security throughout the region.