

Challenges to Disarmament Regimes: The Case of the Biological and Toxin Weapons Convention

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A disarmament treaty is an agent of change in the international security environment in its own right. Disarmament requires the total elimination of the weaponry under consideration.² At minimum, the agreement could therefore be expected to remove the threat posed by that weaponry from the overall threat equation. Unfortunately, the effect of a disarmament treaty on the external security of a state is not as straightforward: the security benefits obtained under the treaty must be evaluated relative to the possible security losses in other domains.

The research into disarmament dynamics and their impact on security is constrained by the fact that only four disarmament treaties exist: the 1972 Biological and Toxin Weapons Convention (BTWC), the 1987 Intermediate-range Nuclear Forces (INF) Treaty, the 1993 Chemical Weapons Convention (CWC) and the 1997 Anti-personnel Mines (APM) Treaty. They cover different weapon categories and, because of the compartmentalisation of analysis, few connections between them have ever been made.³ Furthermore, the four treaties vary in scope, participation and enforceability. The INF Treaty was negotiated between two states, the United States and the USSR, and is applicable only to a well-circumscribed territory. It calls for verification and on-site inspections, which

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2. In this paper, arms control, as a broader set of security policies, refers to the management of levels of weaponry through the mutual acceptance of qualitative or quantitative limitations. As a result, a balance emerges, but the parties to the agreement retain a residual capacity to use these weapons in an armed conflict. Disarmament refers to the total elimination of a specified (sub)category of weaponry, and not to the worldwide elimination of all weapons.

3. For example, in the 1980s certain Western sources strongly believed that some of the Soviet intermediate-range missiles, which were then being deployed against NATO, were capable of carrying chemical warheads. The removal of these missiles under the INF Treaty was not accompanied by a corresponding reduction of the Soviet chemical warfare threat in official statements or more academic analyses. J.P. Zanders, "Chemische wapens en het INF Verdrag" [Chemical weapons and the INF Treaty], *Reeks Studieteksten*, No. 16, Humanistische Werkgroep voor Conflictstudie (HUWECO), Antwerp, 1988. Similarly, no one has pointed out the reinforcement of the norm created by the APM treaty through the CWC, which bans all mines filled with a chemical warfare agent.

meant that the NATO and Warsaw Treaty allies were required to allow inspections on their territories although they were not directly involved in its negotiation. The agreement covers only ground-launched, intermediate-range delivery systems, but similar sea- or air-launched weapons are permitted within the area specified by the treaty. The APM Treaty covers one category of mines only, but it is global. It lacks meaningful verification mechanisms, and its parties may have to resort to periodic review conferences to reinforce the validity of its provisions if security conditions change. Significantly, proponents of the treaty have refused to accept compromises that take ulterior security concerns into consideration. As a consequence, several countries have not joined the treaty because they feel that they have no alternative to the specific security conditions which are addressed by anti-personnel landmines.

The BTWC and the CWC differ significantly from the INF and APM Treaties. Based on the general-purpose criterion, all treaty-targeted objects and activities that have no purpose explicitly permitted by either convention are prohibited. Each convention delegitimises an entire class of weapons, irrespective of its doctrinal function, means of delivery or method of production. As a result, the treaties cover all future discoveries relating to biological and chemical weapons, too. Each party also commits itself individually to the CWC or BTWC and not to other states. A treaty violation by one state party does not nullify the treaty obligations for another state party. Abiding by the conventions can thus create an acute security dilemma, because the state party has renounced chemical or biological weapons under all circumstances, including for purposes of in-kind retaliation or deterrence. A treaty violation or a chemical or biological threat by a non-party will consequently create a highly asymmetrical security condition, whereby the appropriate response must be sought in alternative, non-prohibited measures. Security calculations may thus differ considerably from state to state.

The CWC, however, is a more fully developed convention than the BTWC. It contains extensive verification mechanisms and measures to restore compliance in case of material breaches. The BTWC only has some rudimentary instruments, such as the ability to consult between states parties or lodge a complaint with the UN Security Council. Some serious compliance concerns, such as the allegations of Soviet and Russian biological weapon (BW) programmes or the reports on the so-called Yellow Rain in South-East Asia in the late 1970s, could not be addressed through the treaty. Nonetheless, in the 25 years since entry into force (26 March 1975), a relatively successful treaty regime has emerged as a result of the institutionalisation of the review conferences, which are held every five years. At these conferences the states parties have been able to reaffirm the core disarmament norm and to confirm the scope of the prohibition in the light of the latest developments in the various fields of biotechnology. They have also devised some—albeit voluntary—measures to increase transparency and a consultative process to deal with biological warfare allegations. Despite the progress, the procedures have proved inadequate to address some outstanding compliance concerns, so that the addition of verification and enforcement instruments are necessary to ensure the future viability of the BTWC.

As noted above, the four disarmament treaties are basically different. Nonetheless, the brief discussion contrasting the BTWC and the CWC highlights the fact that the security implications of a disarmament treaty depend, on the one hand, on the intrinsic characteristics of the convention and, on the other, on the

environment in which the treaty must operate. The present paper investigates how the BTWC as a global and comprehensive disarmament treaty affects the security of states parties and under which conditions this security can be augmented. Changes in the environment, such as technological developments, shifts in threat perceptions and changes in the international system, affect the perceived relevance of the convention. In particular, the end of the Cold War and the concurrent rise of several regional centres of power mean that many states will assess the relevance of a global treaty from the perspective of their immediate regional security concerns. Different security conditions will lead to varying security expectations from the treaty. While such considerations have relatively little impact on the BTWC as it stands today, they will play a major role in future efforts to strengthen the treaty regimes by means of formal, legally binding measures.⁴

The BTWC as a Security Mechanism

The BTWC is a disarmament treaty. As a security instrument it seeks to reduce considerably the external threat to states posed by BW and to increase international stability. It therefore requires the collective action of state parties based on the belief that the mutual limitations of military capabilities will increase their security more than the continuation of unilateral security strategies, such as armament. This has major implications for the security of a state party.

First, a state party is required to eliminate all its BW stocks and may not rearm itself with such weapons. Parties that have not previously possessed BW cannot acquire them in the future. These obligations form the heart of Articles I and II of the BTWC. In that sense, the convention is non-discriminatory, as it removes the distinction between possessors and non-possessors.

Second, the disarmament imperative remains in force in the case of an armed conflict. The convention, however, does not explicitly outlaw the use of BW and, as such, does not constitute part of the laws of war. It refers back to the 1925 Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare. Although no contracting party has ever been accused formally of violating the prohibition of biological warfare, the Geneva Protocol has been breached several times with respect to chemical weapons (CW). Furthermore, the norm has been weakened seriously by the disinclination of the international community to sanction (formally) the violator in each case. During the 1996 Review Conference, Iran—having experienced the unwillingness formally to condemn Iraq for its confirmed violations of the Geneva Protocol in the 1980–1988 Gulf War—proposed to amend the BTWC so as to include an explicit ban on BW use. As many state parties feared future submissions to amend other parts of the treaty, a compromise was reached to include a statement in the Final Declaration that BW use “is effectively a

4. Negotiations for a protocol to the BTWC are currently underway in Geneva. The 1994 Special Conference of states parties established an Ad Hoc Group to consider verification measures and other proposals to strengthen the BTWC. In December 1996, participants in the Fourth Review Conference of the BTWC endorsed further intensification of the discussions on a legally binding protocol to the BTWC. It was hoped that a document may be achieved before the Fifth Review Conference at the end of 2001, but at the time of writing (July 2001) the chances of success were extremely bleak.

violation of Article I of the convention".⁵ This language underpinned the long-held understanding that the prohibition to develop, produce, stockpile or otherwise acquire BW would make biological warfare impossible.

Third, as a state party accepts to "never under any circumstances" acquire BW it commits itself individually to the treaty. A violation of the BTWC by another state party does not relieve it of its treaty obligations (although it could withdraw from the BTWC under Article XIII, para. 2). This was a major departure from the Geneva Protocol, which is a contract between states. Under the Geneva Protocol a party could consider itself relieved of its contractual obligations if another party violated the agreement, and several states reinforced this no-first-use principle in explicit reservations. Moreover, the contract does not bind any state as regards non-contracting states or non-state actors, such as indigenous tribes in the erstwhile colonies or ethnic minorities. Since the conclusion of the negotiation of the BTWC in 1972, states have begun to remove their reservations to the Geneva Protocol (in some cases initially only with respect to BW). These moves can be interpreted as a growing acceptance by parties to the Geneva Protocol of the individual commitment never to use BW in armed conflict. They reinforce the regime governing the illegitimacy of BW and biological warfare.

Fourth, as a consequence of the disarmament imperative and the individual commitment to the treaty regime, a state party cannot pursue a security policy based on BW deterrence or retaliation if it faces a threat with BW or is the victim of biological warfare. It must therefore ensure its security through alternative means, which can include diplomacy, asymmetrical deterrence or denial with non-prohibited arms, or the development of defences and protection against a BW attack.

These commitments limit the absolute sovereignty of a state party to defend itself against external threats and thus have an impact on the state party's security deficit. A government has limited leverage over other actors in the international arena. As it is not inclined to accept vulnerability, a strong tendency exists to match the military power of other states on the basis of worst-case scenarios. Yet, it can never meet all contingencies no matter what military preparations it undertakes. Consequently, a security deficit arises between the objective capabilities available to the government and the sense of the threats to the state. The security deficit thus comprises an objective and a subjective component. The objective component consists of elements such as the differences in number and type of weapons deployed or differences in the material base among any number of states (e.g. the size of the territory and population, availability or ease of access to natural resources, or the levels of scientific, technological and industrial development). However, the security deficit is foremost an expression of the subjective appreciation of the threat to the state. This can be based on the nature and the level of security interactions with other states, the assessment of the intentions of other states, the way the competition with them is channelled, and so on. Underlying the appreciation of the threat is also the assessment of the state's own vulnerabilities in the light of the insecurities posed by the international environment. Particularly in the case of imponderable threats (e.g. BW terrorism), vulnerabilities become the dominant, if not the

5. Final Declaration of the Fourth Review Conference of the Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, document BWC/CONF. IV/9, Part II, p. 15.

only, factor in the threat equation. Furthermore, the ways in which leaders identify the security of the political regime or their own survival with the external security of the state can also have a major bearing on their attitudes towards arms control and disarmament. The leadership can similarly buttress its domestic legitimacy by means of international pre-eminence by staking out strong positions in matters of international security. A disarmament treaty might thus require an about-face that is unacceptable to the domestic military or bureaucratic elites that support those in power.

A disarmament treaty can never cover every factor that contributes to a security deficit. However, it will extend certain security benefits, which, in combination with the permitted unilateral measures available to a state party, may be sufficient to deal with lingering security concerns. Certain provisions in the BTWC contain negative and positive security guarantees. At the heart of the BTWC regime lies the negative security assurance of Article I, which specifies that states parties cannot acquire or retain BW under any circumstances. The Fourth Review Conference of States Parties formally expanded the interpretation of this article to cover BW use. The negative security guarantee is reinforced by the requirement in Article II to destroy or divert to peaceful uses all BW and by the non-proliferation provision of Article III. The value of these guarantees is limited, of course, by the absence of verification mechanisms. Attempts have been made through the process of the periodic review conferences to increase the transparency of activities relevant to the convention on a voluntary basis. However, participation in the confidence and transparency-building measures has been limited and is in most cases not systematic. In addition, states parties are only required to provide their declarations in one of the six UN languages and no organisation has been designated to administer, translate, distribute or analyse the submissions. The inability of the BTWC to deal with the 1979 anthrax outbreak in Sverdlovsk (today Yekaterinburg) or the current misgivings about certain activities in Russia have accentuated the limitations of the current negative security guarantees.

One of the BTWC's greatest strengths is the universality of its norm. Its widespread membership greatly reinforces the conventional prohibition and raises the opportunity costs for maintaining a BW armament programme, irrespective of whether a state is a party to the BTWC or not. It also partially compensates for the reduced potency of the negative security guarantees as a consequence of the limited verifiability and enforceability of the convention. In principle, universality ensures that the security deficit of a state is not negatively affected by its participation in the disarmament treaty through the removal of the distinction between possessors and non-possessors of BW. Nevertheless, there are two important considerations regarding the contribution of universality to the reduction of the security deficit.

First, universality is not just a territorial concept; it also has a time dimension. States will seek meaningful guarantees not only at the time of the entry into force of the convention but also afterwards. As a social construct, the convention cannot be assumed to be static. The strength of the treaty regime will inevitably evolve as a consequence of intrinsic and extrinsic factors. As noted above, the intrinsic strength is derived from the way in which a treaty can oversee its implementation and compliance and react against direct threats such as violations. Extrinsic challenges, on the other hand, relate to the environment in which the convention must

operate. Certain developments, such as scientific discoveries and technological innovations or the growing importance of new political actors, can seriously undermine the treaty, or render it irrelevant, if it cannot be adapted swiftly. The international community must redefine the international norm continuously so that the norm remains applicable under all, even unforeseen, circumstances. The BTWC should thus be able to offer the parties sufficient security guarantees over a prolonged period. The process of the review conferences has been very successful in keeping the advances in the fields of genetic engineering and biotechnology within the scope of the core prohibition. Nevertheless, as is discussed below, these developments may challenge the convention in a different way.

Second, universality may paradoxically provide a state with an incentive for defecting from the treaty if that state can expect that it will be the sole possessor of such weapons. To buttress the security benefits derived from universal adherence, the disarmament treaty must include measures of support and assistance to state parties in order to diminish the huge relative military advantage the defecting state might otherwise acquire. A similar condition of potentially disproportionate advantages occurs during the process of achieving global adherence. States ratify the convention at different times and the treaty-imposed constraints on the national security policies may be distributed unevenly for a while. (The problem is alleviated in part by requiring a minimum number of ratifications or the ratification by specified states before entry into force of the treaty.) Therefore, to reduce the risks from a threat or an attack with the banned weapons by a non-state or a defecting state party, the disarmament treaty must extend positive security guarantees. Article VII of the BTWC entitles state parties to receive such support or assistance, but the lack of an organisation to oversee treaty implementation means that there are no institutionalised procedures. Furthermore, any state party has the right to lodge a complaint with the UN Security Council if it finds that another state party is acting in breach of the BTWC. The Security Council will then initiate an investigation (Article VI). Consultations between states parties are another available option to resolve compliance concerns (Article V). As with verification, these provisions have remained underdeveloped, not in the least because of the potential veto by one of the permanent members of the Security Council. Through the process of review conferences, attempts have been made to ameliorate the situation. For example, at the end of 1996 Cuba was convinced that the United States had attacked it with an insect pest. Following an unsatisfactory outcome of bilateral consultations, Cuba requested a clarification according to Article V of the BTWC and the consultative process established by the Third Review Conference in 1991. No on-site investigations were conducted (as nobody requested them) and the other states had to determine the plausibility of the charges on the basis of the Cuban and US submissions. The final report, delivered on 15 December 1997, did not reach a definitive conclusion, but neither Cuba nor the United States challenged the outcome.⁶ The procedure may be imperfect, but it demonstrated its potential for conflict management.

6. J.P. Zanders and J. Hart, "Chemical and Biological Weapon Developments and Arms Control", in *SIPRI Yearbook 1998: Armaments, Disarmament and International Security* (Oxford: Oxford University Press, 1998), pp. 479–480. J.P. Zanders, E.M. French and N. Pauwels, "Chemical and Biological Weapon Developments", in *SIPRI Yearbook 1999: Armaments, Disarmament and International Security* (Oxford: Oxford University Press, 1999), p. 586.

Current Challenges to the BTWC Regime

The weakness of the positive and negative security guarantees has a direct bearing on how the BTWC can deal with security deficits. In the early 1970s this weakness did not have a significant impact: in 1969 President Richard Nixon decided unilaterally to halt BW production and this decision was widely interpreted to mean that BW were of limited military utility.⁷ Since its entry into force in 1975, a number of extrinsic developments have altered the security expectations from the BTWC. Some of these changes relate to the global security environment; others essentially take place outside the military context but have a direct bearing on the future of the convention.

There have been three confirmed cases of material breaches of the BTWC. A major anthrax outbreak near Sverdlovsk (now Yekaterinburg) in 1979 occurred as a result of an accidental release from a nearby military laboratory, suggesting that the Soviet Union, despite being a co-depository of the BTWC, was continuing an offensive BW programme. Doubts persist about the programme's termination by Russia (as successor state to the Soviet Union), as decreed by President Boris Yeltsin in April 1992. Accounts by defectors, the essence of which has become public over the past few years, reveal an unimaginable scale of Soviet BW activities, and breadth of research, development and weaponisation of novel and genetically altered biological warfare agents.⁸ Iraq, which was forced by the UN Security Council to ratify the BTWC in 1991 following its eviction from Kuwait, has been in violation of the convention's core provisions ever since. The elaborate efforts to conceal the BW programme from inspectors from the UN Special Commission on Iraq (UNSCOM) and the willingness to endure international sanctions and military punishment testify to the importance the Iraqi leadership seems to attach to BW.⁹ The Truth and Reconciliation hearings exposed South Africa's BW armament programmes in the late 1970s and 1980s, and subsequent investigations have given greater credibility to allegations of South African biological warfare operations in Rhodesia (now Zimbabwe) and assassination attempts with such weapons.¹⁰ As far as can be ascertained, the South African programmes have been terminated.

7. Following a major review of US chemical and biological defence policies in 1969, President Richard Nixon announced the US renunciation of biological warfare on the grounds that "biological weapons have massive unpredictable and potentially uncontrollable consequences" therefore "may produce global epidemics and impair the health of future generations". Statement by President Nixon on Chemical and Biological Weapons, 25 November 1969, in R.W. Lambert and J.E. Mayer, *International Negotiations on the Biological-weapons and Toxin Convention* (Washington, DC: US Arms Control and Disarmament Agency, May 1975), p. 256. The review had in fact concluded that BW have a great potential military utility, and Nixon's decision was based on the logic that it was better to prohibit these weapons before they became part of the arsenals worldwide.

8. K. Alibek (with S. Handelman), *Biohazard* (London: Hutchinson, 1999); J. Guillemin, *Anthrax* (Berkeley: University of California Press, 1999); P. Lilja, R. Roffey and K.S. Westerdahl, *Disarmament or Retention: Is the Soviet Biological Weapons Programme Continuing in Russia?* (Umeå: Swedish National Defence Research Establishment, December 1999); T. Mangold and J. Goldberg, *Plague Wars* (New York: St. Martin's Press, 1999), pp. 41–213; and J.B. Tucker, "Biological Weapons in the Former Soviet Union: An interview with Dr. Kenneth Alibek", *Nonproliferation Review*, Vol. 6, No. 3 (Spring–Summer 1999), pp. 1–10.

9. M. Wahlberg, M. Leitenberg and J.P. Zanders, "The Future of Chemical and Biological Weapon Disarmament in Iraq: From UNSCOM to UNMOVIC", in *SIPRI Yearbook 2000: Armaments, Disarmament and International Security* (Oxford: Oxford University Press, 2000), pp. 560–575.

10. C. Gould and P.I. Folb, "The South African Chemical and Biological Warfare Program: An Overview", *Nonproliferation Review*, Vol. 7, No. 3 (Fall–Winter 2000), pp. 10–23.

During the late 1980s and the 1990s, expectations about verification also changed considerably. The INF Treaty saw the acceptance of on-site inspections on the territory of the superpowers and their respective allies. The CWC, which was opened for signature in 1993 and entered into force in 1997, set new standards for verifiability and enforceability and, consequently, underscored the lack of similar provisions in the BTWC.

Meanwhile, persistent US allegations during the 1980s that Soviet troops in Afghanistan and Soviet proxies in Southeast Asia were waging biological warfare not only exposed the intrinsic weaknesses of the BTWC, but also raised concerns about BW proliferation. Subsequently, several countries began to be identified as BW proliferators.¹¹ In the mid-1990s, the proliferation threat acquired a new qualitative dimension: the use or threat of use of BW by sub-state actors. The investigations into the activities of Aum Shinrikyo (which had carried out the sarin attacks in Tokyo in March 1995) uncovered the cult's interest in biological warfare agents, although it never managed to produce a viable agent.¹² The shift in focus from CBW in the East–West strategic balance (with its emphasis on arms control and disarmament) towards CBW proliferation (i.e. the acquisition of such weapons by new actors) following the confirmation of Iraq's use of CW by the UN in 1984 led directly to the adoption of export controls on relevant

11. The following states are said to have an offensive BW capability or are in the process of seeking such a capability: China, Egypt, Iran, Iraq, Libya, Russia and Syria. North Korea may be able to wage biological warfare, Sudan may be interested in BW, and there is insufficient evidence to determine whether Taiwan is developing activities prohibited under the BTWC. J.A. Lauder, Special Assistant to the Director of Central Intelligence for Nonproliferation, "Unclassified Statement for the Record on the Worldwide WMD Threat to the Commission to Assess the Organization of the Federal Government to Combat the Proliferation of Weapons of Mass Destruction", 29 April 1999, URL <http://www.odci.gov/cia/public_affairs/speeches/archives/1999/lauder_speech_042999.html>; Arms Control and Disarmament Agency, "Adherence to and Compliance with Arms Control Agreements", 1998 report submitted to Congress, Washington, DC, 1999, URL <<http://state.gov/www/global/arms/reports/annual/comp98.html>>; Central Intelligence Agency, Nonproliferation Center, "Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 January through 30 June 1999", Washington, DC, February 2000, URL <http://www.odci.gov/cia/publications/bian/bian_feb_2000.html>; and Office of the Secretary of Defense, "Proliferation: Threat and Response", January 2001, URL <<http://www.defenselink.mil/pubs/ptr20010110.pdf>>. However, for a word of caution on such proliferation lists, see J.P. Zanders, "The Proliferation of Biological Weapons: A Threat Assessment", *Disarmament Forum*, UNIDIR, No. 4 (2000), p. 9.

12. J.P. Zanders, E. Karlsson, L. Melin, E. Näslund and L. Thaning, "Risk Assessment of Terrorism with Chemical and Biological Weapons", in *SIPRI Yearbook 2000: Armaments, Disarmament and International Security* (Oxford: Oxford University Press, 2000), pp. 537–559. It should be noted that in 1984 the Rajneesh religious cult attempted to influence local elections by contaminating the food in salad bars, and infected 751 people in a trial run in September. However, the incident then did not raise major concern about proliferation to terrorists, partly because the intent of causing disease was only uncovered more than a year later. As international treaties are concluded between states and govern state behaviour, the security challenges posed by terrorism must be dealt with in a broader context than the BTWC. Following a US initiative within the G7 and the Russian Federation in July 1996 the UN General Assembly adopted the text of the International Convention for the Suppression of Terrorist Bombings on 9 January 1998. *International Legal Materials*, Vol. 37, No. 2 (March 1998), pp. 249–260. The scope of the convention covers attacks with toxic chemicals, biological agents, toxins or similar substances. Several states have also included provisions in their domestic penal legislation to cover terrorism with non-conventional weapons. Attempts are also underway to make the development, production, retention and use of chemical and biological weapons punishable under international criminal law. *The CBW Conventions Bulletin*, No. 42 (December 1998), pp. 1–5.

technologies as a new security instrument in the CBW field. Although they were introduced initially as interim measures pending the conclusion of the CWC negotiations and the acceptance of new mechanisms to strengthen the BTWC, they rapidly overtook arms control and disarmament as a principal policy tool to deal with unconventional weapons in the post-Cold War period.¹³

This has some important consequences. First, the proliferation problem is unsolvable. Even if the non-proliferation policies are successful in the case of one country, the threat is never reduced because many other countries will remain the cause for proliferation concerns, while the possibility always exists that other countries may decide to acquire unconventional weapons in the future. Consequently, the threat is always growing. This continuation of the threat justifies increased investment in advanced weaponry (as, for instance, the current limited missile capabilities of North Korea, Iran and Iraq are being invoked by the United States to justify the multi-billion dollar National Missile Defence programme). Second, different countries, or indeed different agencies within a single country, apply different criteria to assess the proliferation threat. Consequently, there is limited consensus on the nature of the proliferation threat, which in turn produces varying non-proliferation strategies. Third, the proliferation threat assessment is highly subjective as is evidenced by the use of terminology like "rogue states". Friendly states will escape sanction (as, for example, Israel in relation to the United States), while other states will be the target of constructive engagement (e.g. North Korea), containment and sanctions (e.g. Iran and Iraq), or even of pre-emptive military strikes (e.g. the US air strike against a presumed CW factory in Sudan in August 1998). Fourth, besides exacerbating political and ideological conflicts, non-proliferation policies tend to pit possessors of certain technologies against non-possessors. Whether these policies actually hamper trade and deny certain countries the right of development is rapidly becoming immaterial; the crux of the matter is that they are increasingly divisive and complicate the implementation of global arms control and disarmament treaties that also promote international co-operation for peaceful purposes (such as the 1968 Nuclear Non-Proliferation Treaty (NPT), BTWC and CWC).¹⁴

The focus on proliferation threats easily feeds into the inherent suspicions regarding the motivations of states in an anarchic system, which, in turn, erodes the confidence in co-operative security approaches like multilateral disarmament. The great difficulties experienced in the tracking and elimination of Iraq's CBW

13. In this new context, arms control and disarmament have become one among several instruments to counter the proliferation of unconventional weapons. Other measures include defence and protection, export controls, sanctions, deterrence and even pre-emptive strikes. There are at least two possible explanations for this shift away from arms control and disarmament as it was practised during the Cold War. On the one hand, the new world order is characterised by multi-polarity and there are no clear strategic balances between the former leading protagonists in the East-West conflict and the emerging regional powers. From this viewpoint, arms control and disarmament can contribute little to the stabilisation of the emerging security environment. On the other hand, it is possible to regard the post-Cold War security environment as one of uni-polarity. As the remaining superpower, the United States sees few security benefits in giving up its relative advantages (both in terms of choice of weaponry and of freedom of action) via arms control or disarmament in return for no significant absolute gains.

14. See, for instance, the various contributions in *OPCW Synthesis* (April 2001), published by the Organisation for the Prohibition of Chemical Weapons in The Hague.

has strengthened opinion that disarmament treaties are essentially unverifiable. Similarly, while the international community has demonstrated a greater willingness to intervene militarily in regional conflicts since the end of the Cold War, an opinion has gained currency that disarmament treaties hobble the peacekeeping and peace-enforcement troops if they have to confront a CBW proliferator. According to this view, the BTWC and CWC actually increase the security deficit of countries engaging in peacekeeping and enforcement operations because they preclude the option of deterrence or retaliation in kind.¹⁵ This alarm about asymmetric warfare is further heightened by concerns about the future application of biotechnology to weapon development, the increasing self-sufficiency of BW programmes, the difficulty of detecting CBW programmes, the use of denial and deception techniques for hiding such activities, and advances in dissemination techniques.¹⁶

Perhaps more than any other arms control or disarmament treaty, the BTWC faces the challenge of technological innovation. Even between the conclusion of the negotiation of the convention in 1972 and its entry into force three years later, major breakthroughs in genetic engineering were announced. They challenged the adopted wisdom that BW had limited military utility because they opened the prospect of designer agents and their antidotes. Today, biotechnology is experiencing an exponential expansion both in terms of the production of research results and the creation of new products available to societies across the globe. Genetic engineering and other areas of biotechnology have become important motors of industrial and societal development, leading to the rapid worldwide diffusion of these new technologies. While this process contributes to the standard proliferation fears regarding the illicit acquisition of advanced biological warfare agents by new actors, the biotechnological advances pose far more complex challenges to the BTWC (and, indeed, to non-proliferation strategies).

Virtually all of the technology required to develop and manufacture BW is dual use, which means that it has current or potential military and civilian applications.¹⁷ Technology is a rather complex concept, because it involves more than just products. It also encompasses the means to conceptualise and produce these products in response to a particular technical problem and the ability to use them in an effective way to solve that problem. Based on this understanding, technology can be defined as comprising "the ability to recognize technical problems, the ability to develop new concepts and tangible solutions to technical problems, the concepts and tangibles developed to solve technical problems, and the ability to exploit the concepts and tangibles in an effective way".¹⁸ In other words, technology involves not only materials and artefacts, but also capital,

15. J.P. Zanders, M. Hersh, J. Simon and M. Wahlberg, "Chemical and Biological Weapon Developments and Arms Control", in *SIPRI Yearbook 2001: Armaments, Disarmament and International Security* (Oxford: Oxford University Press, 2001), p. 532.

16. US Department of State, "CIA Director Tenet Outlines Threats to National Security", Washington File, 21 March 2000, URL <<http://www.state.gov/>>.

17. J. Molas-Gallart, "Dual-use Technologies and Transfer Mechanisms", in D. Schroerer and M. Elena (eds.), *Technology Transfer* (Aldershot: Ashgate, 2000), p. 5.

18. E. Autio and T. Laamanen, "Measurement and Evaluation of Technology Transfer: Review of Technology Transfer Mechanisms and Indicators", *International Journal of Technology Management*, Vol. 10, No. 7/8 (1995), p. 647.

knowledge and skills, as well as principles, techniques and systems for the management of research, development and production processes.¹⁹ It thus follows that certain technologies are tangible (i.e. concrete objects), whereas other ones are intangible. The generation of massive amounts of information is at the heart of the biotechnological revolution. In the information age the control of the transfer of information across borders is close to impossible.

Technological development with regard to biotechnology must also be viewed in terms of product and process improvements. In the context of biological warfare, product improvements may relate to the engineering of novel agents or agents with increased pathogenicity or resistance to environmental deterioration, or to the development of new delivery systems (shells, bombs, missile warheads, or animal vectors). Process improvements may involve research and production techniques. For example, research into the genomes of living organisms generates ever-growing amounts of information. The isolation of a given gene sequence that is responsible for the expression of a particular characteristic in a subset of the human population opens the door to ethnic weapons.²⁰ Similar process improvements contribute to the automated scanning of all kinds of possible chemical structures, which generates huge amounts of data that are placed in public libraries. While only a few compounds are selected for further research and possible future commercialisation, some of them may actually be more toxic than anything presently known to man and be potential candidates for chemical or toxin warfare.²¹ Improvements in production processes can also have an impact on the biological warfare threat. For instance, computerisation of the fermentation process has enabled 24-hour production runs and the optimisation of the production process (e.g. temperature control, feeding of nutrients, etc.). This allows for the operation of smaller fermentors, which, from a proliferation perspective, makes it more difficult to determine whether the installation is used for licit or illicit ends.

A final set of challenges to a disarmament treaty are changes in the international system itself. The BTWC is a typical Cold War agreement. When it entered into force in 1975 the dynamics of the international system focused on the global ideological struggle between the Soviet Union and the United States. The convention was as much a reflection of the propagated belief that biological warfare, while feasible, was of limited military utility as it was of the détente between the superpowers at the beginning of the decade. Therefore, the current realignments in the global system may be expected to affect the ways in which states will view the security benefits of the future treaty regime. The disappearance of a principal organising force on the global level resulting from

19. J. Molas-Gallart, "Which Way to Go? Defence Technology and the Diversity of "Dual-use" Technology Transfer", *Research Policy*, Vol. 26 (1997), pp. 369, 371–372.

20. See T. Bartfai, S.J. Lundin and B. Rybeck, "Benefits and Threats of Developments in Biotechnology and Genetic Engineering", in *SIPRI Yearbook 1993: World Armaments and Disarmament* (Oxford: Oxford University Press, 1993), pp. 293–305; and M. Dando, "Benefits and Threats of Developments in Biotechnology and Genetic Engineering", in *SIPRI Yearbook 1999: Armaments, Disarmament and International Security* (Oxford: Oxford University Press, 1999), pp. 596–611.

21. Toxins are poisonous chemical compounds produced by living organisms (e.g. snake poison, or ricin obtained from castor oil beans). They are covered by both the Biological and Toxin and Chemical Weapons Conventions. Toxins are also produced synthetically. Other types of possible agents in the grey area between chemical and biological warfare are peptides and bioregulators which, while occurring naturally, can also be obtained via these scanning processes.

the end of the bipolar rivalry has contributed to the regionalisation of conflict management and resolution. A weakening of the commitment to global engagement by the larger powers, save in the case of strong and immediate national interests, has reinforced the trend. The steady diffusion of knowledge and technology enables regional state actors to enlarge their political, industrial and military capabilities, which, in turn, will affect regional power balances.²² This development may particularly augment the insecurity of states that have relied on great-power commitments to offset their security deficit. Biotechnology is now within the reach of most countries, and increased regional threats could contribute to its application for military purposes.

The Regional versus Global Interface

The impact of regional geopolitics on global arms control and disarmament is still little understood. This is partly the consequence of the difficulties in comprehending the security dynamics on the intra- and inter-regional levels. Security questions manifest themselves differently depending on whether they are viewed from a global or regional perspective. For example, despite their enormous divergence in capabilities, it is conceivably easier for a small country such as Belgium and a behemoth like China to reach consensus on the security benefits of a global disarmament treaty than it is for Iran and Iraq.

The global level allows for abstraction, which makes it possible to break down security into its composing elements and to deal with each issue independently. Hence, there have been, for instance, different forums for chemical, biological and nuclear weapon disarmament and arms control. Precisely this abstraction makes a state's choice to pursue absolute gains easier. An absolute gain can be understood as the total reward received by a state in response to an action. It does not concern the gains of other states and can be measured by comparing a state's security condition to that of itself at a different time. Thus, the primary benefit a state may obtain from joining a co-operative regime like a disarmament treaty is the decrease in the likelihood that a potential adversary will inflict damage with the prohibited weaponry.

The regional level of analysis and policy making lacks much of the abstraction and consequently preserves the atmosphere of concern relating to relative gains. Relative gains offer a state disproportionate benefits that change the balance in relation to other states. They consequently enable it to influence other outcomes in the same or other security-related domains or offer it continued advantages by allowing it to secure additional gains in the future. When seeking or fearing relative gains, states compare themselves with other states. In a regional setting, the distribution of capabilities becomes less theoretical because the states in question often share borders. Even in the case of non-contiguous countries, the quality of particular weapon systems (e.g. ballistic missiles) will force states to supplement their traditional perimeter defence with over-the-horizon assets. The security dilemma and the resultant security deficit may be more acute on the regional level if manifest adversary security relationships exist between states. The threat perceptions can be particularly acute, so that joining a disarmament

22. B. Buzan, O. Wæver and J. de Wilde, *Security: A New Framework for Analysis* (Boulder: Lynne Rienner, 1998), p. 9.

regime may involve too great a security risk (i.e. involving relative losses) if other issues are not addressed simultaneously. Regional policy makers therefore often argue that the insights and solutions offered by global and regional approaches to security are mutually exclusive.

The regionalisation of international security following the end of the Cold War has had a major impact on the pursuit of gains. Certain states are seeking a position of regional dominance and are thus trying to maximise their relative gains. Other states in the same region fear this ascendancy and, consequently, seek to balance the threat through power accumulation of their own or, at least, by minimising their relative losses. The fixation on relative gains on the regional level makes it less attractive for states to pursue absolute gains on the global level and may therefore negatively affect the incentives for a global disarmament treaty. Nevertheless, concerns about relative gains need not necessarily manifest themselves at the level of military security—states may be vying against each other for economic or political pre-eminence—or with respect to the weaponry under consideration for arms control or disarmament. The question then becomes how regional actors can jointly isolate the security concern posed by a particular weapon category. Furthermore, states do not necessarily hold static perceptions of gains. Certain situations may emphasise the importance of relative gains, while other circumstances may encourage the pursuit of absolute gains. The perception of its security deficit at any given point in time determines the nature of the security strategies a state will adopt. The issues here are how the regional security environment can be ameliorated in order to become conducive to arms control or disarmament and what strategies are available to optimise the benefits for states under such a treaty.

To analyse the opportunities for arms control or disarmament in the global versus regional interface, the concept of the “regional security complex” is used in this paper as a heuristic device.²³ In terms of security analysis, a subsystem of security interactions among a territorially coherent set of states is known as a regional security complex. It comprises a group of states within a particular geographical area whose primary security concerns link together sufficiently closely so that their national securities cannot realistically be considered apart from one another. It points to the intense interdependence among a set of states that distinguishes that particular set from neighbouring ones. The relatively strong, inward-looking character of the security relationships among those states makes them stand out from the general background. Consequently, the outward security interactions with neighbouring states are relatively weak. In this way, it becomes possible to identify the boundaries of a complex based on the criterion of “relative indifference”. Relative indifference explains why the accumulation of particular kinds of weapons affects the threat perception of the countries within the region and why they are viewed with less concern outside that region.

The structure inside a regional security complex is characterised by the arrangement of the units and the differentiation among them, the patterns of amity and enmity, and the distribution of power among the principal units. The

23. The notion of a regional security complex is discussed in detail in B. Buzan, *People, States & Fear* (New York: Harvester Wheatsheaf, 1991), ch. 5; and Buzan, Wæver and de Wilde (footnote 22), ch. 1.

patterns of security interdependence can vary. At one end of the spectrum lies conflict formation, characterised by fear, rivalry and mutual-threat perceptions. In the middle are the security regimes, in which states still view each other as potential threats, but have set up reassurance arrangements to reduce the security dilemma among them. At the other end lies the pluralistic security community, in which the members no longer expect or prepare for the use of force against each other.²⁴ Security complexes are durable but not permanent. They can be dissolved (e.g. through regional integration as in the case of the European Union) or redefined by changes in their structure (e.g. by a redistribution of power or capabilities). Moreover, a particular geographical area may belong to different security complexes, depending on the type of security (military, political, economic, and so on) under consideration.

Applying the concept of regional security complex, it becomes immediately clear that a global disarmament treaty has to embrace a variety of existing security relations. States may or may not have active security interactions with each other. Within a given set of security interactions all, some, or none of the participating states may possess the arms category under consideration. For each state, the reasons for possessing or not possessing these weapons may differ. The relative importance attached to the arsenal furthermore depends on whether the state in question views itself as a global, regional or sub-regional actor. Moreover, although disarmament treaties deal foremost with military security, their non-proliferation clauses also mean that they will have an impact on other levels, such as political and economic security. Indeed, if the weaponry that is the object of the treaty does not play a role in the regional force postures, these other levels may become the prime locus of considerations on whether or not to join the disarmament treaty.

Nonetheless, irrespective of the security environment, policy makers will not forsake a weapon category or the option to acquire it if the move increases the security deficit.²⁵ Only weaponry in functional equivalence between the major political entities concerned can be isolated from the overall security equation and thereby fulfil a precondition for sustainable disarmament. Functional equivalence of weaponry between two or more political entities is attained when the political entities assign that weaponry a similar function in their respective military doctrines. Weaponry in functional equivalence is characterised by the fact that any change in its constitution by one political entity would be countered by a similar change by an adversary. Conversely, if a particular type of weaponry is not in functional equivalence, then changes by one side would elicit an asymmetrical response from the other side or none at all. In other words, functional equivalence is an important catalyst in the appropriate security

24. Buzan, Wæver and de Wilde (footnote 22), p. 12. The authors use concepts developed by other international relations theorists: Dieter Senghaas, Raimo Väyrynen (conflict formation); Robert Jervis (security regimes); and Karl Deutsch (pluralistic security community).

25. For example, several states that have resisted signing the APM treaty have long static frontiers (China, Russia) or demarcation zones (the United States on the Korean peninsula) to defend. This raises the question whether the negotiating strategies adopted by the proponents of the ban were not influenced by visions—amplified by media coverage—of highly mobile warfare to the exclusion of scenarios of static warfare. Removal of APM can thus be construed as increasing the security deficit of states with important perimeter defence requirements, which, in turn, may explain their reluctance to join the agreement.

environment rather than an independent promoter of arms control and disarmament. If absent, the weapon category cannot be isolated and submitted for negotiation because it retains significant supplementary value to meet the security deficit of a given state.²⁶

Two major routes to functional equivalence exist. First, through countervailing deployment, weaponry can be introduced for the explicit purpose of offsetting a specific deployment by the adversary.²⁷ Second, functional equivalence can emerge as a result of functional shift within the military doctrine of a country. Functional shift is a possible outcome of the assimilation of a weapon system into mainstream military doctrine.²⁸ An existing weapon system can acquire a doctrinal function which is different from that for which it was intended. The assimilation process may also lead to function specialisation, whereby a weapon system is assigned to or adapted for more narrowly defined missions. This can happen when, for example, a new system is introduced for tasks similar to those performed by another weapon. For example, in the late 1940s and early 1950s the US CW arsenal was intended to offset the Soviet dominance in manpower and armour and did not attain a condition of functional equivalence until the 1970s and 1980s, when it was assigned the role of in-kind deterrence. The Soviet Union and the United States confirmed this condition in the 1989 US–Soviet Memorandum of Understanding on Chemical Weapons (the Wyoming Agreement). Shortly thereafter announcements were made of planned stockpile reductions.²⁹

As a consequence of functional equivalence, no party in the equation has an incentive to alter the balance since other countries would counter such a change with a similar move. Enhancement of weaponry in functional equivalence has limited utility because it is unlikely to result in a relative gain in terms of function of the weaponry concerned for any of the parties involved. Instead, it would raise the opportunity costs for all parties to maintain the increased capability. Co-operation thus becomes possible. By isolating that arms category and submitting it to an international arms control or disarmament regime state

26. J.P. Zanders and E.M. French, "Article XI of the Chemical Weapons Convention: Between Irrelevance and Indispensability", *Contemporary Security Policy*, Vol. 20, No. 1 (April 1999), pp. 64–69.

27. For example, NATO deployed Pershing II and cruise missiles in Europe in the 1980s to counterbalance Soviet intermediate-range nuclear forces. Within a relatively brief span of time they were eliminated by means of negotiations. The condition is manifestly present in the reductions of intercontinental ballistic missiles (ICBM) and other strategic delivery vehicles. Functional equivalence was probably created formally for the first time in the joint Vladivostok statement of 24 November 1974 when the United States and the Soviet Union agreed that they were entitled to a certain aggregate number of strategic delivery vehicles, comprising ICBMs, submarine-launched ballistic missiles and heavy bombers as a foundation for further arms limitation talks. J. Goldblat, "Disarmament Negotiations in 1974", in *World Armaments and Disarmament: SIPRI Yearbook 1975* (Stockholm: Almqvist & Wiksell, 1975), p. 419.

28. For the assimilation model of armament dynamics, see J.P. Zanders, "The Demand Side of CBW Proliferation", in Schroeder and Elena (footnote 17), pp. 167–186. It is also explained with graphics in the Internet Educational Module on CBW Non-proliferation, created by the SIPRI CBW Project, the Centre for Peace and Security Studies of the Free University of Brussels and the International Relations and Security Network (ISN), Zürich, URL <<http://cbw.sipri.se>>.

29. United States Information Service, *U.S.–Soviet Relations: Agreements Achieved During the Baker–Shevardnadze Talks (September 22–23, 1989)* (Brussels: US Embassy, September 1989), p. 3; and United States Information Service, *President Bush Addresses U.N. General Assembly: U.S. Ready to Destroy CW if Soviets, Others Join in Effort* (Brussels: US Embassy, 26 September 1989), pp. 3–4.

parties can achieve absolute gains. Arms control or disarmament reduces the security deficit produced by that particular class of weapons as well as the opportunity costs for maintaining a response to the threat.

The condition of functional equivalence is not, as noted, an independent promoter of disarmament, but a necessary catalyst if the security environment is conducive to such policies. If the threat of a military confrontation is acute, a state can feel that, despite functional equivalence, the reduction or elimination of a particular class of weaponry would magnify the security deficit. If functional equivalence is not present for a particular class of weapons, countries will seek relative gains in terms of the function of the weapon concerned in order to increase their own security to the detriment of the adversary. In such circumstances, co-operation becomes difficult if not impossible. Arms control and disarmament are improbable because the adversaries cannot isolate the class of arms as a constituting element of the threat. This reinforces the motivation for armament.

Looking at global arms control and disarmament treaties from the perspective of regional security, the condition of functional equivalence can manifest itself in three different ways:

- (1) *Functional equivalence is irrelevant.* The weaponry under consideration does not enter the security equation because no state possesses it or fears its use from outside powers. The irrelevancy of functional equivalence can also manifest itself when states agree that a particular type of weaponry has little or no military use and can be dispensed with before it increases security deficits. Entering an arms control or disarmament treaty presents no significant security gains, but also no losses. (States can obtain a major moral gain, a factor that played an important role during the negotiation of the BTWC.) However, if a cost is involved in the implementation then that cost has to be compensated sufficiently to provide an incentive. Examples are the opportunities for international co-operation offered by the BTWC and CWC.
- (2) *Functional equivalence is non-existent.* The type of weaponry under consideration is part of the regional security equation, but only some regional actors possess it. This gives them a major relative advantage over their neighbours that they cannot achieve by any other means. Adversaries may also have deployed the weaponry, but assigned it different functions in their military doctrines so that no direct link between the respective capabilities is perceived. In either case, states can base their security calculations on expectations of relative gains, so that the preconditions for disarmament do not materialise.
- (3) *Functional equivalence is present.* Arms control or disarmament becomes possible because no further relative gains in terms of the function of the weaponry under consideration are possible. Through co-operation in the arms control or disarmament regime, all parties can achieve absolute gains. However, the catalytic properties of functional equivalence will manifest themselves only if the overall security environment is conducive to the reduction of the arms category under consideration.

Functional Equivalence and the BTWC

The irrelevance of functional equivalence for BW was the predominant condition when the BTWC was opened for signature in 1972: many people chose to believe

in the limited military utility of BW and few states were presumed to have a BW capability. Consequently, the intrinsic weaknesses of the convention were not seen to affect the security deficit significantly.³⁰

Paradoxically, this perception of the impact of the BTWC on the security deficit of individual states accounts for the high number of states parties and of non-ratifying signatory and non-signatory states.³¹ Given the length of time since the opening for signature, the BTWC apparently offers no or insufficient incentives for the non-states parties to join. If small states and islands and the successor states to the Soviet Union are excluded, then the number of non-state parties that do not belong to a regional security complex is high (with the highest concentration in Central Africa).³² The convention offers non-states parties few potential absolute gains in terms of social and economic benefits, so that few other incentives to become a party are present.³³ The lack of an international body to oversee the implementation of the BTWC also means that there is no institutional pressure for signatory and non-signatory states to become parties. In contrast, the Organisation for the Prohibition of Chemical Weapons (OPCW), both in its Preparatory Commission (PrepCom) phase and today, organises outreach programmes so that many states with a marginal security interest in the CWC as well as those with great security stakes have been convinced of the absolute gains they may obtain from joining the treaty. Consequently, the clusters of major non-signatory states to the CWC reflect areas where functional equivalence for CW is absent or the security deficit would be influenced negatively by entering into the treaty regime.

It was noted that the condition of functional equivalence acts as a catalyst for disarmament in the right security environment. Apart from the route of countervailing deployment, functional equivalence can emerge as an outcome of function shift (the weapon takes on a new role in military doctrine) or functional specialisation (the weapon is assigned a more specific role in military doctrine and the previous functions are taken over by a new weapon). According to the assimilation model of armament dynamics this occurs because, even after the successful incorporation of a weapon into mainstream military doctrine, the

30. Some states did express their concern about the intrinsic weaknesses. France, for example, initially refused to become a state party to the BTWC because of the lack of verification measures and instead adopted domestic anti-BW legislation in order to accept the same constraints as imposed by the convention. It acceded to the BTWC in 1984, one of the most important reasons being its interest to participate in the debate to reinforce the procedures for verification. N. Sims, *The Diplomacy of Biological Disarmament* (London: Macmillan, 1988), p. 264. Sweden similarly continued to express its concerns about the intrinsic weaknesses of the convention and sought to strengthen the treaty regime through the review conferences.

31. As of July 2001 the BTWC has attracted 144 ratifications and a further 18 states have signed the convention. Thirty-two countries have neither signed nor ratified it. Updated lists are available from URL <<http://projects.sipri.se/cbw/docs/bw-btwc-mainpage.html>>.

32. Barry Buzan has identified five major regional security complexes: the Middle East, South America, South Asia, Southeast Asia and Southern Africa. Buzan (footnote 23), p. 210.

33. In contrast, the CWC offers states parties important absolute gains in the form of the right to request assistance and protection in the case of use or threat of use of CW, to participate in transactions involving certain chemicals listed in the schedules, which is denied to non-states parties, and to enjoy the benefits of technology transfers and participation in international co-operation for non-prohibited purposes. The chemical industry is a recognised fundamental pillar of sustainable economic development, which explains the relevance of these potential absolute gains to developing countries.

forces that led to its integration must remain active in order to keep it integrated and prevent its removal from the military arsenal. Because of the dynamics in armament programmes, functional equivalence cannot be assumed a natural end stage. Weapon systems can assume different functions in the respective military doctrines and consequently break the link of functional equivalence. In other words, functional equivalence may be a temporary phenomenon as it shifts from existence to non-existence.

Because of this process of functional differentiation, a disarmament treaty may not be an end stage. Extrinsic developments may place a heavy strain on the condition of functional equivalence that contributed to the conclusion of the convention and add to the pressures for a state to withdraw from the treaty. Such pressures from developments in the security environment are, for instance, very visible with respect to the 1972 Anti-Ballistic Missile (ABM) Treaty. Concluded during the Cold War, it stabilised the armaments competition between the two superpowers, as it guaranteed the vulnerability of the opponent's population, infrastructure and nuclear forces. Currently, the proliferation of ballistic missiles in unstable regions and their growing ability to reach the United States and some of its allies contribute to the momentum to develop and build new ballistic missile defences. The shift from a bipolar to a multi-polar global system places great strains on the bilateral ABM Treaty and feeds the calls to amend or even abrogate it. As already noted, the viewpoint that the CWC hobbles peacekeepers because it precludes in-kind retaliation or deterrence against a regional actor presumed to possess such weapons is also in part rooted in the pressure that external changes may have on a treaty. In other words, disarmament treaties turn a condition of existing functional equivalence into an irrelevant one or confirm the prevailing condition of irrelevance. Extrinsic developments may create a security environment in which functional equivalence becomes non-existent. It is precisely to counter the threat of withdrawal of state parties from the treaty under such circumstances that the disarmament convention must be able to offer strong positive security guarantees.

The assumed irrelevance of functional equivalence for BW is now being challenged by fears of proliferation (both to state and sub-state actors) and concerns about the dual-use potential of civilian technological innovation. The feared designer biological warfare agents of the future appear to open up the prospect of fresh major relative gains. Indeed, if a political actor were able to design its unique biological warfare agent as well as their prophylactic, it would possess the ultimate relative gain: an event that would kill any presupposition of arms control or disarmament. These perceptions have gradually increased the security deficit (especially its subjective component) and created a security environment in which a significant number states have come to perceive that functional equivalence with respect to BW is non-existent. As expectations or fears of relative gains enter the security calculations, the underlying conditions for disarmament are gradually being eroded: they emphasise the intrinsic weaknesses of the BTWC and place growing demands on the security guarantees to be offered by a future BTWC security regime.

A major question concerns how states in regional military security complexes may reposition themselves with respect to BW in view of the changes in the security deficit. A remarkable feature of the current debate is that it deals largely with potential threats. The greatest actual threat still comes from "traditional"

agents, such as anthrax.³⁴ The countries of gravest concern remain located in regions with intense security interactions (East Asia, Middle East). It can therefore be postulated that, for the immediate future, little will change for those regional military security complexes where functional equivalence is non-existent or where it may be irrelevant, but where the overall security environment is not conducive to disarmament. Currently, there are no known regions where functional equivalence with respect to BW exists. In other geographical areas, the irrelevancy of functional equivalence for BW will continue to be the determining characteristic.

However, because of the role that biotechnology plays and will play in the development of a society, the future BTWC regime also affects the economic, political and societal security of states. The current debates on the emerging BW threats may further securitise other issues, such as emerging and re-emerging diseases, that pose a direct threat to societies in all parts of the world. The interest shown by many countries to participate in the future BTWC regime would then be determined not by BW threats but by, for example, the right to participate in international exchanges and have access to the new biotechnologies that could help them to counter their societal threats and enhance their economic and political security. The BTWC offers such a right in Article X. However, until now, the provision has seen little concrete implementation and besides broad political statements at the review conferences, the countries most vocal on the issues have yet to formulate concrete demands. One reason contributing to this lack of concrete requests may have been that states can obtain many of the prospective benefits through other international organisations or arrangements, like the World Health Organization. Nevertheless, the issue will be crucial if future measures to strengthen the BTWC are to receive universal acceptance. It will also be very complex in the light of the fact that states can also realise their absolute gains through other agencies. In this respect, the difference with the CWC is significant.³⁵

The global picture with respect to the BTWC might not appear to be fundamentally different from the previous two decades. However, one major feature of the current regionalisation of security is often overlooked, namely the total military desecuritisation of the interactions among the states in Western and Central Europe, North America, Australia and some East-Asian industrialised democracies. Economic or political conflicts between them will not lead to military action as these states have adopted other means of conflict resolution. This also means that whatever the size or composition of the military capabilities of a particular state, they will not adversely affect the security deficit of the other countries. Thus, if one or more of these states develop and expand the civilian scientific and technological capabilities that might also bring designer biological warfare agents within reach, then other states within these two regions will not view these capabilities as an emerging military threat (but may still

34. For example, the US Department of Defense began a mandatory vaccination programme against anthrax for its 2.4 million active duty and reserve personnel in 1998. The vaccine currently being applied was developed during the 1960s and licensed in 1970. General Accounting Office, *Anthrax Vaccine: Safety and Efficacy Issues*, GAO/T-NSIAD-00-48 (Washington, DC: US General Accounting Office, 12 October 1999), p. 1.

35. The role of Article XI of the CWC is discussed in Zanders and French (footnote 26).

regard them as economic, political or societal threats).³⁶ Among these states functional equivalence has become totally irrelevant. Consequently, the internal incentives to engage in complex (and costly) arms control or disarmament arrangements are low if compared with the Cold War period when these countries faced existential threats, and it affects the current negotiation of measures to strengthen the BTWC in Geneva.³⁷

However, similar scientific and technological developments outside those countries will become securitised, as is evidenced by the rise of the BW proliferation threat since the end of the Cold War. As they do not possess BW, they clearly view these developments in terms of relative gains. The proliferation angle also securitises developments in biology and biotechnology on the economic and political levels for these countries. The exponential advances being made confirm and extend the lead of the two regions over other parts of the world (relative gains) and an inherent reluctance exists to trade off this advantage for the absolute security gain of a reduced BW threat, which, in any case, does not exist for them. Sharing the technology and knowledge with outside regions, in the current state of thinking, would exacerbate the proliferation threat. For the other geographical areas where the BW threat is irrelevant, access to such technology and knowledge, as part of international assistance or co-operation, would address issues other than military security. This is the level on which the debates between the developed and developing worlds on the role of the Australia Group—an informal multilateral export control arrangement, in which several industrialised countries co-ordinate their CBW-relevant national export controls—in the context of the BTWC regimes are being conducted.³⁸

Concerns about possible loss of relative gains under the future BTWC regime also exist on the sub-state level. Because of the verification requirements in complex treaties, civilian enterprises are confronted suddenly with questions of military security. These questions cut through the policies of economic security that these companies have adopted in order to maintain their competitive edge. Biotechnology companies, for instance, often have very long lead times before they can commercialise the results of their research. Moreover, in many instances they have been founded on a single patent. Large firms may research several options in anticipation of creating a single commercial success in the long run. In all these cases, inadvertent loss of propriety information can have serious financial implications and the sector is therefore reluctant to agree to intrusive verification mechanisms.

The chemical sector has been more receptive to the CWC, in part because of

36. For example, while conducting research into immuno-contraception for mice, Australian scientists at the Cooperative Research Centre for the Biological Control of Pest Animals discovered that certain genetic changes in the mousepox virus may make the pathogen more deadly. The scientists made the findings public in January 2001 as they realised the potential of their discovery for biological warfare purposes. Concerns with respect to proliferation dangers were expressed, but no industrialised democracy feared that Australia had acquired an undue advantage (in fact, by immediately publishing the research results, Australia effectively denied itself such an advantage). A. Duncan, "Comment on Biowarfare Implications", CSIRO, Canberra (10 January 2001), URL <<http://genetech.csiro.au/Biowarfare.ADuncan.doc>>.

37. See footnote 4.

38. On the level of military security, there is no disagreement regarding the need to prevent or halt proliferation, a fact which is confirmed by the acceptance by all parties of the non-proliferation clauses in both the BTWC and the CWC and of the export control mechanisms in the CWC.

its negative role in efforts to control chemical warfare in the first half of the 20th century and in part because of its direct involvement in the proliferation of CW during the 1970s and 1980s. Not only the chemical threat in the East–West confrontation, but also the widespread use of CW in the 1980–1988 Iran–Iraq war and the threat of their use in the 1990–1991 Kuwait war added urgency to the need to control these weapons. The history of biological warfare is far more obscure and little is publicly known about BW armament programmes after World War II. Moreover, as the current international environment lacks the overarching military threat of the Cold War, the governments of industrialised countries are less inclined to impress a national security imperative on the relevant companies in order to have them accept intrusive international inspections. For instance, European and North American enterprises compete in the same market, so the governments would be extremely reluctant to erode the competitive edge of their respective industries in the absence of a level playing field.³⁹ It is therefore highly unlikely that the biotechnological companies of one region will be willing to accept any future inspections if the other region resists such verification measures. These economic imperatives can seriously hamper the strengthening of the intrinsic characteristics (verification and compliance mechanisms) of the future BTWC regime.

Conclusion

The BTWC establishes a clear disarmament imperative. However, the treaty regime does not operate in a vacuum, and the norm must remain durable in a changing environment. A dialectic between prohibition and permissibility as influenced by environmental conditions will continuously redefine the boundaries of the legal constraint. This dialectic originates with the scope of the international norm. The definition of the object of the norm, the principles on which it is primarily founded and the duration of its applicability, among other things, determine the grey areas surrounding the norm or define the circumstances under which the norm may not be applicable. They also define the point beyond which a state may feel that breaking the norm might benefit it more than adhering to it (e.g. if a state's further existence is seriously threatened). The number and identity of states subscribing to the norm determine the degree of universality. The intrinsic strength of the disarmament treaty is further reinforced by the availability of instruments to verify and enforce compliance and the emergence of a treaty regime—the set of rules, procedures, principles and expectations among states parties—which will remove the ambiguities of the grey areas.

As evolving extrinsic conditions affect the dialectic between prohibition and

39. This problem is manifest in the implementation of the CWC. Until early in 2000, OPCW inspectors were unable to visit certain chemical industrial facilities in the United States because the US Department of Commerce has not yet issued the specific directions for the industry declarations. The EU Presidency complained about this situation during the Fourth Conference of the States Parties held in The Hague on 28 June–2 July 1999, arguing that the disproportionate number of such inspections carried out within the European Union places these companies at a competitive disadvantage because of the extra financial costs and disruptions. K. Neubert, Statement made on behalf of the European Union to the Fourth Conference of States Parties to the Organisation for the Prohibition of Chemical Weapons, The Hague, 28 June 1999.

permissibility, they will present the treaty with fresh challenges. New developments that have a bearing on the object and purpose of the treaty can fall outside the scope of the treaty if that scope is too narrowly defined or interpreted. They can also widen the grey areas or render the international agreement irrelevant. The success and durability of a prohibition thus depends on how well the intrinsic characteristics of the treaty are suited to a new environment as well as on the vitality and, therefore, the adaptability of the treaty regime. In other words, with the passage of time the disarmament imperative will require reaffirmation and reinforcement, especially in changed circumstances, to retain its prohibitory quality.

Considering state behaviour solely from the perspective of a global disarmament treaty fails to take into account the impact of local or regional security dynamics on the cost/benefit assessment of each state. The heuristic device of the regional security complex accentuates the fact that not every country is pitted against every other country. It dispenses with the need to investigate spurious security relationships that could theoretically exist between states inside and outside the complex. The concept of functional equivalence as an indispensable catalyst for arms control or disarmament reveals the diversity of reasons why states may join a global disarmament treaty and the types of gains they might expect.

In 1975, the condition of functional equivalence regarding BW was generally assumed to be irrelevant, which enabled the acceptance of an intrinsically weak convention. Soon thereafter allegations of serious violations and scientific and technological innovations began to strain the BTWC. Through periodic review conferences, state parties have been able to preserve the core disarmament obligation and adapt its scope to the revolution in the biological sciences. The review conferences also enabled state parties to explore measures to increase transparency with respect to activities of relevance to the BTWC or outbreaks of diseases. Although the mechanism of the review conferences is not suited to deal with serious violations of the convention, it nevertheless nurtured a growing consensus among state parties about the need to strengthen the BTWC with verification and compliance mechanisms.

Despite this progress, the threat associated with BW is said to be growing. However, most of the factors contributing to the increased threat perception are subjective components of the security deficit. They include: proliferation; the increased likelihood of open wars with the possibility of a multinational intervention against a possessor of BW; the emergence of new actors besides states in matters of international security; the fear of designer agents made possible by the rapid developments in the fields of biology and biotechnology; emerging and re-emerging diseases; and the accentuation of the weaknesses of the BTWC by the intrinsically stronger CWC. The growing realisation of the deficiencies in the defences against BW—detection, protection, prophylaxis and consequence management—adds to the security deficit. Known cases of great concern, such as Iraq, North Korea and Russia, are being reconsidered in the light of these extrinsic changes affecting the BTWC. Although the perception shifts are mostly subjective, they nonetheless transform the previously accepted irrelevance of functional equivalence for BW into the condition of non-existence. As noted above, the condition of non-existence of functional equivalence complicates the achievement and maintenance of global disarmament treaties considerably.

One factor of particular importance in this transformation is the regionalisation of military security after the end of the Cold War. It is not just a question of varying expectations of relative or absolute gains depending on the security condition a state perceives itself to be in, as was revealed by the application of the heuristic device of the regional security complex. It is also one of shifting appreciation of the relative importance of different types of security, whether military, political, economic or societal. Complex disarmament treaties aim primarily to eliminate the threat posed by a particular type of weaponry, but they also reach deeply into areas that would not become the subject of military security concerns under normal circumstances.

In regions like Europe and North America, there has been a total military desecuritisation of the interactions among states since the end of the Cold War. In its stead, economic and political rivalry has become more prominent and is particularly intense in leading-edge technologies. The respective governments are consequently unlikely to agree to procedures (such as verification mechanisms) that may negatively affect the relative scientific, technological or industrial position if the other region resists these measures. Resistance to future disarmament measures to strengthen the BTWC also comes from the sub-state level, where individual companies worry about their economic security and relative losses in a highly competitive environment. Without an overarching existential threat, these concerns rank higher in the negotiating positions of European and North American states than during the Cold War. The main military threats come from outside both regions and the interactions with other geographical areas will remain militarily securitised. This is evident from the various non- and counter-proliferation measures, which aim to prevent strikes (e.g. with BW) against the territory of European or North American countries, on the one hand, or to reduce the possibility or consequences of having to confront a proliferator during a military intervention in a local or regional war, on the other hand. In other words, from this perspective functional equivalence is non-existent.

In other geographical areas, technological and industrial advances can become securitised on various levels. For many developing countries, such advances offer opportunities to improve their domestic political, societal and economic security (absolute gains) or to secure a better springboard for competing in the international markets (relative gains). If there is no particular threat with the weaponry under consideration (irrelevance of functional equivalence), these states may try to secure additional absolute gains through the clauses in the BTWC that address international co-operation and the right of access to technology for purposes not prohibited by that convention. However, such absolute gains for developing countries may be viewed as a question of relative gains by Europe and North America both in terms of proliferation risks and of losing their relative technological and economic advantage in the global market. This implies that the controversy may sharpen considerably between developed and developing nations over international co-operation as an integral part of a disarmament treaty. The fact that the knowledge and technology required for the development and manufacture of BW is essentially dual use in nature further exacerbates the problem.

In summary, unless there is a major development, such as a new state acquiring biological weapons and willing to use them in armed conflict, the irrelevance of functional equivalence for BW may still be assumed both inside and between

the different regions. The objective component of the security deficit has been affected qualitatively mainly by the revelations regarding Iraq's BW programmes and the emerging details of continuing offensive BW-relevant research using advanced biotechnological techniques in Russia.⁴⁰ However, in the subjective component of the security deficit there is a strong tendency to view the BW threat as if functional equivalence were non-existent. It is most visible in the interactions between Europe and North America, where relations among states have been militarily desecuritized since the end of the Cold War, and other geographical regions. The concerns about relative gains manifest themselves on the various levels of security. As security policies are often conceived based on the perception of a threat rather than the threat itself, this condition may complicate the pursuit of BW disarmament considerably.

The increased role of the regional security actors means that, worldwide, the expectations related to a future agreement strengthening the prohibition against BW will be vastly different from what was expected of the BTWC. The meaningful implementation of Article X of the BTWC will become extremely important if ratifications of a future agreement by states outside regional security complexes are to be secured. Potentially problematic in this respect are the fundamentally different attitudes regarding military security depending on whether it involves interactions with states from inside or outside the European and North American regions. Both the internal competition in the economic and political spheres and the securitisation of external relations in the context of proliferation threats have complicated the current negotiation on the protocol to reinforce the BTWC.⁴¹

As the situation currently stands, universality will be the principal victim if the opinion were to gain currency that the conclusion of the negotiation of the protocol to the BTWC should not be delayed because a particular state in Europe or North America refuses to compromise in the spheres of political or economic security for the sake of verification. Universality, and its accompanying security benefits, will be similarly damaged if Europe or North America were to decide that they can equally, if not better, ensure their external security through unilateral strategies such as non- and counter-proliferation and consequently ignore the need for developing states to obtain absolute gains in other spheres than military security.

The debate on the relative importance of the security and non-security (i.e. development) provisions of a modern disarmament treaty addresses the fundamental ideological assumptions concerning the nature of international security and co-operation. However, in a global regime, the positions regarding security and development cannot be mutually exclusive. The prevailing security conditions in a given region, together with the assessment by a state of its capability to survive or enhance its position in a hostile environment, play a basic role in the decision to join a co-operative security arrangement. Only as the cost-benefit analysis of the impact of the BTWC on the security deficit becomes less negative does the relative importance of non-security provisions grow because states can focus more on securing absolute gains. Developing countries with a greater

40. There are other reports about BW proliferators (see footnote 11). The alleged BW proliferators are located in regions where the security environment is not conducive to disarmament, so that for the purposes of this discussion the condition of functional equivalence with respect to the objective component of the security deficit is inconsequential.

41. See footnote 4.

interest in the non-security clauses can adopt policies of greater transparency in all of the areas covered by the BTWC in order to allay the security concerns of other parties. Industrialised countries, which have expressed grave concern about proliferation and consequently about the relative gains to be acquired by remaining outside the treaty or defecting from it, must recognise that their security will benefit not only from verification of the absence of BW programmes but also from a higher degree of universality. To achieve the latter, the industrialised states must accommodate the different expectations that states may have from the future BTWC regime. Unfortunately, in the current negotiating round of the protocol the new security realities have not yet been fully taken into account.

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