

# Chemical and Biological Weapons' Disarmament

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## 1 Introduction

The use of pathogenic microbes, toxins and chemical agents in warfare has ancient roots in human history<sup>1</sup> and still represents a serious concern for international security today, as chemical and biological weapons 'might prove attractive in [...] new conflict situations, particularly because they lend themselves to tactics such as terror, population displacement, and wider forms of social/economic destabilization'.<sup>2</sup>

From a legal point of view, a synergy does exist between international humanitarian law (IHL) and arms control and disarmament law (ACDL): both fields of law ban the use of biological and chemical weapons, although with a different approach. While, under IHL, the use of these weapons is considered contrary to fundamental principles, such as the prohibition of superfluous injury or unnecessary suffering,<sup>3</sup> under ACDL, the ban is rather linked to the general aim of lowering the risk of war by reducing the overall number of weapons.<sup>4</sup>

The definition of States' disarmament obligations in this field gained momentum with the adoption of the 1972 Convention on the Prohibition of the Development, Production, Stockpiling and the Use of Bacteriological (Biological) and Toxin Weapons and on their Destruction (BWC),<sup>5</sup> while it took more time to reach an international consensus on chemical weapons. The Convention on the Prohibition of the Development, Production, Stockpiling and the Use of Chemical Weapons and on their Destruction (CWC) was open

1 SM Block, 'The Growing Threat of Biological Weapons' (2001) 89 *American Scientist* 28; V Pitschmann 'Overall View of Chemical and Biochemical Weapons' (2014) 6 *Toxins* 1761.

2 C McLeish and R Trapp, 'The life sciences revolution and the BWC' (2011) 18 *The Nonproliferation Review* 534.

3 See ch 21 by Mauri.

4 E Myjer and J Herbach, 'Arms Control Law as the Common Legal Framework for CBRN Security' in A Malizia, M D'Arienzo (eds), *Enhancing CBRNE Safety & Security: Proceedings of the SICC 2017 Conference* (Springer 2018).

5 Convention on the prohibition of the development, production, stockpiling and the use of bacteriological (biological) and toxin weapons and on their destruction (1972) (Biological Weapons Convention, BWC). The BWC currently has 183 States Parties.

for signature only in 1993.<sup>6</sup> Unlike the BWC, the CWC imposes a stringent verification mechanism on States as a necessary condition of their renunciation of chemical weapons, because such weapons are perceived to be a more concrete military option than biological armaments.<sup>7</sup> As a matter of fact, despite pathogenic microbes having a significant comparative advantage over chemicals (since they do not need to be produced in large quantities to be weaponised because they replicate within the host and they are more powerful per unit weight<sup>8</sup>) they still appear to not really be practicable for military purposes, as their effect might easily spread beyond any control.<sup>9</sup> Historical records seem to confirm this point: 'the few known cases since World War II of countries using biological weapons mostly have involved small-scale operations in support of internal regime security, whether through assassinations of dissidents, regime rivals, or in counterinsurgency operations'.<sup>10</sup> However, risks connected to the potential use of biological weapons remain topical, in particular, with reference to non-State actors.

The present chapter aims at exploring the role of ACDL in combating the use of chemical and biological weapons and in ensuring their destruction. It analyses the two Conventions, assessing their different compliance monitoring systems, identifying challenges to their implementation and contextualising them in a broader non-proliferation regime, where other multilateral and institutional initiatives take place.

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- 6 Convention on the prohibition of the development, production, stockpiling and the use of chemical weapons and on their destruction (1993) (Chemical Weapons Convention, CWC). With its 193 States Parties, it is the arms-control and disarmament agreement with the largest participation today. For an overview: P Gargiulo, 'Le armi chimiche. Aspetti di diritto internazionale e disarmo. Pt. I' (1987) 42 *La comunità internazionale*, 9; P Gargiulo, 'Le armi chimiche. Aspetti di diritto internazionale e disarmo. Pt. II' (1987) 42 *La comunità internazionale*, 167.
- 7 NA Sims, 'A simple treaty, a complex fulfillment: A short history of the Biological Weapons Convention Review Conferences' (2011) 67 *Bulletin of the Atomic Scientists* 10.
- 8 JB Tucker 'Strengthening the BWC: Moving Toward a Compliance Protocol' (1998) *Arms Control Today* <<https://www.armscontrol.org/act/1998-01/arms-control-today/strengthening-bwc-moving-toward-compliance-protocol>> (all links were last accessed on 4 May 2021).
- 9 Pitschmann (n 1) 1766.
- 10 G Cross and L Klotz, 'Twenty-first century perspectives on the Biological Weapon Convention: Continued relevance or toothless paper tiger' (2020) 76 *Bulletin of the Atomic Scientists* 187; AR Fooks and LK Holmstrom, 'United Nations Secretary-General's Mechanism' (2017) 36 *Revue scientifique et technique de l'Office international des épizooties* 630.

## 2 Treaty Obligations and Verification Regimes: A Comparison

The use of chemical and biological weapons in armed conflicts was banned, for the first time, with the adoption of the 1925 Geneva Protocol, at the Conference for the Supervision of the International Trade in Arms and Ammunition, held under the auspices of the League of Nations.<sup>11</sup> The agreement, however, prohibited only the use and not the development of these weapons. Additionally, some States made reservations to the Protocol, with the intention to limit the non-use obligation only with respect to other States Parties and/or to preserve the possibility of using such means of war in response to an attack involving them.<sup>12</sup>

In 1968, the issue of chemical and biological weapons was included on the agenda of the then Eighteen-Nation Committee on Disarmament in Geneva. It then took four years to adopt the BWC, prohibiting the development, production, acquisition, transfer, retention and stockpiling of biological and toxin weapons and implicitly banning their use in warfare. According to Article IX of the BWC, States undertook to renew negotiations on an agreement to destroy chemical weapons and prohibit their development and stockpiling. In the following years, efforts continued within the UN Conference on Disarmament to prepare a draft convention on chemical weapons. Many events, in the late 1980s, contributed to reinforce this intention, including the use of chemical weapons during the Iran-Iraq War. An agreement was finally adopted in 1993, explicitly banning the use of chemical weapons, along with their development, production, acquisition, retention, transfer or stockpiling.

If three main elements are usually at stake in arms control treaty negotiations – namely, political concerns over security and sovereignty; economic issues, connected to potential financial and commercial gain or loss as the outcome of adherence to the treaty; and effectiveness of the arms control regime, to be assessed via verification mechanisms<sup>13</sup> – the two Conventions couldn't be more different. While the BWC can be described as an arrangement driven mainly by political considerations, the CWC, on the contrary, 'represents a

11 Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare ('1925 Geneva Protocol') (1925).

12 TM Rajah, G Dawson and L Aylett, 'The Chemical Weapons Convention and the Contribution of the Organisation for the Prohibition of Chemical Weapons to Sustainable Development' (2019) 24 *Journal of Conflict & Security Law* 619.

13 T Taylor, 'The Chemical Weapons Convention and prospects for implementation' (1993) 42 *Int'l & Comp LJ* 918.

treaty where there is more balance between the three elements<sup>14</sup> [...] which was possible only in the political climate of the 1990s'.<sup>15</sup>

A major difference between the two agreements concerns the verification regime.

### 2.1 *The Biological Weapons Convention and the Meaning of Transparency in ACDL*

The adoption of the BWC was aimed at achieving 'effective progress towards general and complete disarmament, including the prohibition and elimination of all types of weapons of mass destruction'.<sup>16</sup> It was also based on the idea that an agreement on the prohibition of bacteriological (biological) and toxin weapons would represent 'a first possible step towards the achievement of agreement on effective measures also for the prohibition of the development, production and stockpiling of chemical weapons'.<sup>17</sup>

Under Article I, the BWC bans the development, production, stockpiling, acquisition or retention of 'microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes'. Weapons, equipment or means of delivery designed to use these agents or toxins for hostile purposes or in armed conflict are also outlawed under Article I. While the BWC does not openly ban the use of biological and toxin weapons, it prohibits that implicitly, recalling the 1925 Geneva Protocol in the Preamble and reaffirming the obligations assumed under it by States Parties (art VIII). Furthermore, as stressed by Sims, 'the treaty does not limit its scope to existing biological agents and toxins, but instead anticipates future developments. It bans any weaponization of disease, as well as preparatory steps toward weaponization'.<sup>18</sup>

Insisting on the intended purpose of bioagents and equipment, the Convention cannot be read as banning biodefence programmes, designed to develop defensive measures against bio-threats.<sup>19</sup> In fact, the Convention recognises the right of States Parties to participate 'in the fullest possible exchange of equipment, materials and scientific and technological information for the

14 In particular, only the CWC includes provisions on economic and technological development: see art XI.

15 Taylor (n 13) 918.

16 BWC, Preamble.

17 Ibid.

18 Sims (n 7) 9.

19 D Kimball, 'The Biological Weapons Convention (BWC) At A Glance' (2020) Arms Control Today <<https://www.armscontrol.org/factsheets/bwc>>.

use of bacteriological (biological) agents and toxins for peaceful purposes' and promotes international cooperation in the scientific development 'in the field of bacteriology (biology) for the prevention of disease, or for other peaceful purposes' (art x).

According to the BWC, each State Party should also take any necessary measures to prohibit and prevent the development, production, stockpiling, acquisition or retention of the prohibited substances and equipment 'within the territory of such State, under its jurisdiction or under its control anywhere' (art iv). States' obligations, therefore, extend to the potential activity of non-State actors within their territory. Additionally, per Article III, States Parties undertake 'not to transfer to any recipient whatsoever, directly or indirectly, and not in any way to assist, encourage, or induce any State, group of States or international organizations to manufacture or otherwise acquire' any of the banned substances or equipment.

Finally, the Convention requires States Parties to destroy or, at least, divert to peaceful purposes the prohibited agents, toxins, weapons, equipment, and means of delivery, within nine months after the Convention's entry into force (art II).

Rather than establishing a specific verification mechanism, the Convention mandates States Parties to consult with one another and cooperate, bilaterally or multilaterally, to solve compliance concerns (art v). They are also called upon to provide or support assistance to a victim of bioweapons attack, whenever the Security Council has established that a State Party has been exposed to danger as a result of violation of the Convention (art vii). Lastly, the Convention allows States Parties to lodge a complaint with the UN Security Council, providing the relevant evidence, whenever they believe that another Member is violating the Convention's obligations. The Security Council can investigate such complaints and States Parties have to cooperate with it. Nevertheless, this power has never been invoked and, indeed, its limits are self-evident: 'if one of the five permanent members of the Security Council were to be the subject of an accusation, its veto power in the Council could block any possible resolution of the issue'.<sup>20</sup>

In the years since the adoption of the BWC, States Parties have maintained their efforts in promoting cooperation in the field and exploring the possibility of establishing a proper verification mechanism, in particular during the review conferences held every five years.<sup>21</sup>

20 MI Chevrier & I Hunger, 'Confidence-building measures for the BTWC: performance and potential' (2000) 7 *The Nonproliferation Review* 29.

21 Rather than being convened to amend the BWC, the review conferences contributed to insisting on the treaty's binding power and to tracing its implications: Sims (n 7) 10–11.

During the Second Review Conference, while some countries supported the idea of creating a specific procedure for verification, others considered this approach not feasible and many delegations stressed the urgency of concluding the negotiations on the CWC, which could then offer a model for a possible future BWC verification protocol.<sup>22</sup> As a result, a set of Confidence-Building Measures (CBMs)<sup>23</sup> have been introduced by way of an *interim* solution to encourage transparency about relevant national biological activities and facilities.<sup>24</sup> Confidence-building measures mainly consist in the exchange of information and data on relevant facilities, programmes, legislation, as well as on outbreaks of infectious diseases.<sup>25</sup> These measures were considered important in order to reduce secrecy and, therefore, increase confidence among States, with the final aim to reinforce reliance on the treaty and improve international cooperation in the field of peaceful biological activities. The CBMs system has been modified during the subsequent review conferences, with slight changes in the formulation of the measures and, more importantly, with the establishment, during the Sixth Review Conference in 2006, of a BWC Implementation Support Unit (ISU), within the Geneva branch of the UN Office for Disarmament Affairs, tasked to receive and distribute confidence-building measures from and to States Parties.<sup>26</sup>

Since the introduction of the CBMs, States Parties' negotiations on a more structured verification mechanism have continued.<sup>27</sup> Between 1995 and 2001, an ad hoc Group engaged in negotiations on a Compliance Protocol to the BWC, with the aim of establishing an international body to receive declarations of treaty-relevant facilities and activities; to conduct routine on-site visits; to conduct challenge inspections in case of doubtful activities; and to investigate suspicious outbreaks of diseases.<sup>28</sup> However, the draft issued by the

22 F Lentzos, 'Hard to prove' (2011) 18 *The Nonproliferation Review* 573.

23 Confidence-Building Measures can be described as 'arrangements designed to enhance [...] assurance of mind and belief in the trustworthiness of states and the facts they create': JJ Holst, 'Confidence-Building Measures: A Conceptual Framework' (1983) 25 *Survival* 2.

24 Lentzos (n 22) 573.

25 For a comment on the use of the Convention as a platform for addressing infectious disease threats arising naturally, and malicious dissemination of pathogenic microorganisms: C Enemark, 'The role of the Biological Weapons Convention in disease surveillance and response' (2010) 25 *Health Policy and Planning* 486.

26 Sims (n 7) 13.

27 JP Zanders & AE Smithson, 'Ensuring the future of the Biological Weapons Convention' (2011) 18 *The Nonproliferation Review* 480.

28 Tucker (n 8).

ad hoc Group in 2001 was rejected by the US<sup>29</sup> and the negotiations to adopt a BWC Protocol have definitely failed. Interestingly enough, while early drafts of the Protocol used the word ‘verification’, it soon became clear that this term would not only raise the opposition of some States Parties,<sup>30</sup> but that it also did not necessarily recall the proper concept for assessing compliance with a treaty in the field of biological weapons. In fact, if the heart of verification is seen as ‘the ability to detect a militarily significant violation of a treaty’s limits’,<sup>31</sup> this standard usually works well ‘for arms reduction treaties involving weapons that take a long lead-time to develop, produce, and deploy’.<sup>32</sup> In the case of biological weapons, because pathogenic microbes replicate within the host, the scope of the conduct that will constitute a suspected violation might be extremely different and ‘even small illegal stockpiles may have significant military consequences’.<sup>33</sup> Indeed, promoting transparency, rather than implementing verification, appeared as a more concrete aim for the measures envisaged in the Protocol.<sup>34</sup>

Thus, the current system is not conceived as a verification apparatus but rather as a compliance regime,<sup>35</sup> aimed at strengthening transparency. As explained by Hunger and Dingli, the system includes, on the one hand, a monitoring tool (the CBMs) through which States can demonstrate compliance on a regular basis and, on the other, alternative ‘transparency-enhancing mechanisms’<sup>36</sup> – the consultative process under Article v and the UN-led investigations under Article vi – can be activated in case of suspicions, ambiguities, or compliance concerns. Confidence-building measures are commonly defined as *politically* binding, meaning that, while they are not mandatory under international law, States have formally agreed to abide by them. Indeed, this ‘formal agreement adds political muscle and a certain degree of moral suasion to push countries to fulfill their commitments’.<sup>37</sup> More generally, transparency might help to reinforce adherence to the treaty and, despite the low

29 KD Mahley, ‘Statement of the United States to the Ad Hoc Group of Biological Weapons Convention States Parties’ Geneva, July 25, 2001, <<https://2001-2009.state.gov/t/ac/rls/rm/2001/5497.htm>>.

30 Lentzos (n 22) 577.

31 Zanders & Smithson (n 27) 480.

32 Ibid 481.

33 Ibid 481.

34 The final protocol draft does not mention the word verification even once but uses the word transparency dozens of times: Cross & Lynn Klotz (n 10) 186.

35 F Lentzos ‘Strengthening the Biological Weapons Convention confidence-building measures: Toward a cycle of engagement’ (2011) 67 *Bulletin of the Atomic Scientists* 27.

36 I Hunger & S Dingli, ‘Improving Transparency’ (2011) 18 *The Nonproliferation Review* 515.

37 Chevrier & Hunger (n 20) 26.

use of biological weapons in past decades, this is of major importance in view of potential evolution of science and technology, as will be stressed below.

## 2.2 *The Chemical Weapons Convention and Institutionalised Verification*

The structure and style of the CWC are very different from the BWC. While the BWC is a lean text, the CWC appears to be a very comprehensive agreement, completed by three annexes (namely the Annex on Chemicals, the Annex on Implementation and Verification and the Annex on the Protection of Confidential Information) in which, along with States obligations, practical steps for disarmament are envisaged in detail.

Article I CWC states the general obligations of States Parties: it is a broad provision containing a variety of duties. First, it bans development, production, acquisition, stockpiling, retention and transfer of chemical weapons (art 1.1 a). Second, it prohibits the use of such weapons, as well as any military preparations to utilise them (art 1.1 b and c). It also makes clear that using riot control agents as a method of warfare is prohibited (art 1.5). As one scholar has underlined, a certain flexibility was necessary in dealing with the issue of riot control agents, defined as 'chemicals not listed in a Schedule which can produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure' (art 11, para 7). During negotiations, while most States wanted to maintain the right to use riot control agents, some delegations believed that they should be used only by the police, while others reaffirmed the need for armed forces to have access to them, especially whenever the military is deployed to support civil power.<sup>38</sup> In any case, it was clear that allowing riot control agents for general use in warfare might result 'in an unscrupulous State Party concealing a chemical warfare capability in the form of an incapacitant'<sup>39</sup> and, therefore, the solution was to ban riot control agents in war, while law enforcement, including domestic riot control, was defined as a permitted purpose (art 11, para 9). This produced a bizarre effect, as the Convention prohibits a means of warfare against combatants, which conversely can be applied against non-combatants.<sup>40</sup>

In addition to the abovementioned prohibitions, Article I also requires States Parties to destroy chemical weapons and chemical weapons production facilities they own or possess, or that are located under their jurisdiction or control (art 1.2 and para 4), as well as all chemical weapons they have abandoned on

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38 Taylor (n 13) 913.

39 Ibid 914.

40 Ibid 914.



the territory of another State Party. Finally, it prohibits parties to assist, encourage or induce, in any way, anyone to engage in any activity prohibited under the Convention (art I.1 d).

Article VII of the CWC extends the States' obligations with reference to the activity of non-State actors. While the spirit of the norm is the same as Article IV of the BWC, this provision – resulting from an intense negotiation<sup>41</sup> – goes further, in detailing that each State Party shall enact criminal legislation to forbid natural and legal persons, under its jurisdiction, from undertaking any prohibited activity (art VII.1.a) and shall also extend such legislation to any activity 'undertaken anywhere by natural persons, possessing its nationality' (art VII.1.c).<sup>42</sup> In addition, States Parties shall not to permit such activities in any place under their control, such as foreign bases and occupied territories (art VII.1.b).

The CWC defines the prohibited chemical weapons by reference to their purpose: all toxic chemicals and their precursors are banned, with the exception of those 'intended for purposes not prohibited under [the] Convention' (art II.1.a). Munitions, devices and other equipment designed to cause death or other harm through the banned toxic chemicals are included in the definition (art I b and c).

Articles III, IV, and V itemise the disarmament undertakings in different operative phases (starting from the declarations on existing chemical weapons and chemical weapons production facilities) and require the elimination of chemical weapons and facilities within a defined timeframe.

Article VI regulates legitimate activities in the field of chemical industry: while enunciating the right of each State Party 'to develop, produce, otherwise acquire, retain, transfer and use toxic chemicals and their precursors for purposes not prohibited under [the] Convention', it also subjects chemicals and chemical production facilities to verification measures provided in the Verification Annex.

The verification regime is at the heart of the agreement. As highlighted by Krutzsch, Myjer and Trapp, 'there is no other subject of the Convention that has been developed in more detail in the treaty text'.<sup>43</sup> Most of the relevant rules are contained in the Verification Annex, but also some CWC provisions (arts VIII, IX, XII) contribute to defining a normative framework, aimed at

41 Ibid 917.

42 According to Taylor, some delegations wanted the extension of criminal legislation also to legal persons, focusing on the activities of multinational companies: Taylor (n 13) 917.

43 W Krutzsch, E Myjer, R Trapp, 'The Chemical Weapons Convention – Objectives, Principles, and Implementation Practice' in W Krutzsch, E Myjer, R Trapp (eds), *The Chemical Weapons Convention: A Commentary* (OUP 2014) 8.

managing compliance concerns. In addition, the Chemicals Annex lists toxic chemicals and their precursors, for the application of verification measures, and the Confidentiality Annex deals with the need to protect – in the verification process – security interests of the States Parties, as well as the business priorities of their industries.<sup>44</sup>

Contrary to the compliance regime developed with reference to the BWC, verification under the CWC has an institutionalised nature, with an independent international supervisory organisation – the Organisation for the Prohibition of Chemical Weapons (OPCW) – tasked with ensuring the implementation of the Convention. The OPCW is responsible for the international verification of compliance with the CWC, and it also provides a forum for consultation and cooperation among States Parties. Article VIII of the CWC contains the statutory provisions of the OPCW, establishing its three main organs, namely, the Conference of the States Parties, the Executive Council and the Technical Secretariat.

Notwithstanding the institutionalised nature of the verification procedure under the CWC, dialogue among States Parties is encouraged. Under Article IX, the States Parties undertake to consult and cooperate to resolve any doubts about compliance with the treaty. Different mechanisms are considered in the provision, ranging from bilateral consultations to multilateral procedures.

Article IX also regulates the so-called 'challenges inspections', which are fact-finding missions in relation to concerns raised by a State Party that another State Party may be violating the Convention. These inspections must be 'carried out for the sole purpose of determining facts relating to the possible non-compliance' (art IX, para 9). Each State Party can request 'an on-site challenge inspection of any facility or location in the territory or in any other place under the jurisdiction or control of any other State Party for the sole purpose of clarifying and resolving any questions concerning possible non-compliance with the provisions of this Convention' (art IX, para 9). The inspected State, on its part, has the 'the right and the obligation to make every reasonable effort to demonstrate its compliance' and, to this end, to allow the inspection team to accomplish the mandate, providing access to the requested site, while adopting measures 'to protect sensitive installations, and to prevent disclosure of confidential information and data' (art IX, para 11). This system is unique for two main reasons. First, there is no pre-condition (such as a suffered injury or a concrete threat to national security) that must be satisfied before a State Party can request a challenge inspection. Although the requesting State must refrain from unfounded inspection requests (art IX, para 9) and the OPCW Executive

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44 Krutzsch, Myjer, Trapp (n 43) 8.

Council is called upon to prevent misuse of these instruments (including by requiring the requesting State to bear part of the ‘financial implications’ of a challenge inspection that is found to have been abusive (art IX, para 17)), it is undeniable that ‘all that is needed for a request is the political will of a state to make one’.<sup>45</sup> Secondly, the challenge inspections are to be carried out on the territory of a State Party anytime, anywhere and without possible refusal, as the requested Party is obligated to accept the inspection. These instruments represent a powerful intrusion into State sovereignty, justified as ‘a means to uncover clandestine activities and provide a safety net in the event that routine verification fails, as well as to reach facilities beyond the scope of routine inspections’.<sup>46</sup>

In case of non-compliance with the treaty obligations, the Conference of the OPCW may adopt measures envisaged under Article XII, restricting or suspending the non-compliant State Party’s rights and privileges under the Convention, recommending collective measures to States Parties in conformity with international law or, in cases of particular gravity, bringing the case to the attention of the United Nations General Assembly and the United Nations Security Council.

A particular feature of the CWC is the protection of confidentiality, assured through the provisions contained in the Confidentiality Annex, which details the duties of the OPCW in collecting data and information; the measures to be adopted by the inspected States and the inspection teams to protect sensitive installations and to prevent disclosure of confidential data in the course of on-site verification activities; and the procedures to be followed in case of breaches, or alleged breaches, of confidentiality.

### 3 Challenges to Verification: Dual-Use and Developments in Science and Technology

Although the ACDL normative corpus appears to be solid and consistent, challenges to its proper application come from inherent limits to its enforcement, recognisable both in the ‘soft’ treaty compliance monitoring system established for the BWC, and in the more structured verification mechanism of the CWC.

45 T Abe, ‘Challenge inspections under the Chemical Weapons Convention: between ideal and reality’ (2017) 24 *The Nonproliferation Review* 170.

46 *Ibid* 168.

Scrutinising the implementation of disarmament obligations in relation to biological and chemical weapons is primarily made difficult by the dual use of most bioagents and chemicals. As already discussed, under both the regimes, the intended purpose is what makes the distinction between biological or chemical agents that can be legitimately produced, stockpiled or used and materials that are banned as outlawed weapons of mass destruction. Indeed, monitoring adherence to ACDL obligations in this field requires assessing whether the agent is produced for peaceful purposes or not, that is, whether the State has an offensive or defensive intent.

From this perspective, measures aimed at improving transparency around activities relevant to the core prohibition of the treaties are of a key importance. Due to the dual-use nature of most agents in biotechnology and chemistry, the 'state's transparency about these activities and its willingness to explain them are of utmost importance to increasing confidence in [their] peaceful nature of such activities'.<sup>47</sup> This notwithstanding, the compliance monitoring method established for the BWC presents some inherent limitations. To begin with, the confidence-building measures system still faces low and quite inconsistent participation,<sup>48</sup> although there have been slight improvements in submissions.<sup>49</sup> It is true that there is a growing international expectation of transparency which is 'transforming the past common practice of state secrecy about certain activities into an indicator of malevolent intent',<sup>50</sup> but it is also undeniable that the extent to which the release of data by a State will effectively increase confidence among other parties depends upon the reputation of that country for compliance, as well as the quality of the information provided.<sup>51</sup> Indeed, not all delivered information necessarily contributes to broadening transparency. In addition, it should be considered whether current CBMs are capable of addressing present security concerns, in which bio-weapons threats could come more easily from non-State actors than from central governments.<sup>52</sup>

Under the CWC, on the other hand, the institutionalised monitoring regime has increased cooperation among States and the very existence of the challenge

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47 Hunger & Dingli (n 36) 514.

48 Lentzos (n 35) 29.

49 According to the Annual report of the Implementation Support Unit 2019 (BWC/MSP/2019/4), delivered on 8 October 2019, while the number of States Parties submitting CBMS forms in a timely manner is increasing, a total of 57 States Parties have never submitted them (para 23).

50 Zanders & Smithson (n 27) 481.

51 Chevrier & Hunger (n 20) 27.

52 Lentzos (n 35) 28; Lentzos (n 22) 578–579.

inspections might be considered a deterrence for non-compliant States,<sup>53</sup> despite the fact that it has never been put into practice. A major reason for this lack of practice is that bilateral consultations – not involving the OPCW institutional framework – are often preferred as an option, also considering that requesting a challenge inspection may complicate relations between the States involved.<sup>54</sup> Another issue are the different interpretations adopted, on the one hand, by the European Union, the United Kingdom, and the United States, which consider that consultative measures do not necessarily have to be exhausted before requesting a challenge inspection, and the opposite position held by Russia, China, and Iran (accepted also by the Non-Aligned Movement cwc States Parties and the China Group), which stress the need to take consultative measures before asking for a challenge inspection.<sup>55</sup> Although Article IX makes clear that challenge inspections are independent from other measures, the interpretative dichotomy might contribute to a certain resistance in requesting them.<sup>56</sup> In any case, even admitting that ‘the more time that elapses without a request being made, the more difficult making such a request will become’,<sup>57</sup> the challenge-inspection system still plays an important role in preventing noncompliance, rather than detecting it.<sup>58</sup>

Other and more pressing challenges to ACDL in the fields of biological and chemical weapons come from the continuous development of science and technology. For example, while biological weapons have, in the past, exploited infectious organisms from nature (like smallpox, plague and anthrax), genetic engineering might now open new possibilities for ‘black biology’, namely the application of new techniques of molecular biology to improve weapons. Similarly, in the chemical industry, advances in technology and the discovery of new compounds might be relevant to the object and purpose of the cwc.<sup>59</sup> According to one scholar, for example, ‘it is thus possible to assume that in the future, new forms of the accumulation of stocks of chemical [...] weapons will occur, which will be produced by the virtual synthesis of new toxic substances from unmonitored chemical agents’.<sup>60</sup> Therefore, scientific and technological progress needs to be governed to prevent and avoid new threats, but it is also important to sustain peaceful research. Most chemicals and biological agents are commonly applied in commercial manufacturing and might

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53 Abe (n 46) 168.

54 Ibid 174–175.

55 Ibid 173.

56 Ibid 174.

57 Ibid 184.

58 Ibid.

59 Krutzsch, Myjer, Trapp (n 43) 13.

60 Pitschmann (n 1) 1781.

be crucial to pursue public interests (such as the protection of public health, through the production of vaccines, antibiotics, biological pesticides, feed supplements, etc.), including the development of tools for countering the effects of biological and chemical weapons.<sup>61</sup> Considering gene editing, for example, the Meeting of Experts on review of developments in the field of science and technology related to the BWC has stressed that while this technique 'could make the acquisition, development, and production of biological weapons easier; it could also help to counter such risks, for example through the design of more effective medical countermeasures, or through improved means of detection'.<sup>62</sup>

A topic of special concern is the convergence of biology and chemistry,<sup>63</sup> as a source of new potential challenges in terms of development of biochemical weapons, namely, 'biologically active chemical compounds or compounds produced by a specific chemical mechanism in a living organism'.<sup>64</sup> In fact, there is already a clear convergence between chemistry and biology in the life sciences, which demonstrates the relationship between infectious disease, toxins, bioregulators and chemical agents, and determines, in practical terms, a growing overlapping of their corresponding industries.

From our perspective, this means not only that progress in fields such as synthetic biology, nanomaterials and additive manufacturing can make monitoring and inspections much more complex, but also that this progress may pose legal issues for verification and treaty implementation, as it inevitably questions the 'traditional understanding of the boundaries between the regimes that govern, respectively, the prohibition of chemical and biological weapons'.<sup>65</sup> Indeed, while the BWC and the CWC share the same origin (the Geneva Protocol) and are normatively linked (as proved by the reciprocal

61 A Üzümcü, 'The Chemical Weapons Convention-disarmament, science and technology' (2014) 406 *Analytical and Bioanalytical Chemistry* 5072.

62 Meeting of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, Report of the 2018 Meeting of Experts on review of developments in the field of science and technology related to the Convention BWC/MSP/2018/MX.2/3, 12 November 2018, para 16.

63 Evans points out the distinction between convergence and dual-use technologies as independent concepts: '[...] a general rule is that "dual use" concerns a multiplicity of uses from a single piece of [science and technology], while "convergence" denotes a particular use arising from a multiplicity of [science and technology] developments': NG Evans, 'Models of scientific and technological review for the Biological and Toxin Weapons Convention' (2019) 26 *The Nonproliferation Review* 355.

64 Pitschmann (n 1) 1776.

65 Krutzsch, Myjer, Trapp (n 43) 13.

textual references),<sup>66</sup> a possible 'convergence' of the two different arms-control regimes has yet to be explored. For the time being, these developments 'may require combined action of both implementation systems, and [pose] conceptual questions about legal consequences for both treaties'.<sup>67</sup>

#### 4 Other Elements of the Biological and Chemical Weapons Non-Proliferation Regime

Rules and procedures established through the adoption of the BWC and CWC have to be contextualised in what can be considered as a broader non-proliferation regime against the development and use of biological and chemical weapons.

First, different multilateral initiatives aim at reinforcing the rules established by the two Conventions. In particular, the G-8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction promotes the adoption and full implementation of a range of multilateral treaties and other international instruments, seeking also to strengthen the institutions designed to implement them.<sup>68</sup> Similarly, the Australia Group represents a forum for coordination among its members on export controls on chemical precursors and dual-use chemical equipment, as well as on biological weapons agents and toxins, and related dual-use equipment.<sup>69</sup>

States' efforts have also been supplemented by initiatives undertaken by international organisations (other than the UN) which might significantly contribute to the fight against biological and chemical weapons due to their expertise and field of action. For example, the World Health Organization has developed global alert and response activities that are central to the detection, verification and containment of epidemics, elements which are vital to effective international containment efforts, also in the event of the intentional release of a biological agent. While the main focus of the WHO is on the public health aspects of preparedness and response,<sup>70</sup> its expertise might provide general

66 CWC, Preamble para 5 and Article XIII; BWC, Articles VIII and IX.

67 Krutzsch, Myjer, Trapp (n 43) 11.

68 CL Thornton, 'The G8 global partnership against the spread of weapons and materials of mass destruction' (2002) 9 *The Nonproliferation Review* 135.

69 DH Joyner, *International Law and the Proliferation of Weapons of Mass Destruction* (OUP 2009) 116–117; see also ch 25 by Viterbo.

70 See for example: World Health Organization, *Preparedness for the deliberate use of biological agents A rational approach to the unthinkable* (WHO 2002); *Public health response to biological and chemical weapons: WHO guidance* (WHO 2004).

support to States and the international community in implementing ACDL. Similarly, an important role is played by the World Organisation for Animal Health (OIE), as the continuous sharing of data on occurrence, prevention and control of zoonosis is extremely important. In addition, considering that biological agents could be weaponised with the intention of triggering agricultural sabotage and/or endangering food security,<sup>71</sup> the contribution of the Food and Agriculture Organization (FAO) is also crucial.

The role of international organisations was particularly stressed during the BWC Eighth Review Conference in 2016.<sup>72</sup> Moreover, since 2003, delegates from the abovementioned and other organisations (such as the World Trade Organization and the International Plant Protection Convention), along with representatives from the biopharmaceutical industry, research institutes and scientific organisations, have participated in the annual meetings of experts and BWC members. These meetings have been held since the collapse of the Compliance Protocol negotiations and are known as 'intersessional processes'. This broad participation confirms the 'diversity of actors that can make positive contributions to the policing of the BWC's prohibitions'<sup>73</sup> and that 'the prevention of biological weapons is becoming a more broadly shared responsibility'.<sup>74</sup>

Finally, two mechanisms within the UN system complete this scenario: the Committee established pursuant to Resolution 1540 (2004) and the Secretary-General's Mechanism for Investigation of Alleged Use of Chemical and Biological Weapons.

Resolution 1540 (2004) affirmed that the spread of nuclear, chemical and biological weapons and their means of delivery constitutes a threat to international peace and security and, thus, required States to adopt legislation to prevent their proliferation, calling also for a full implementation of multilateral treaties aimed at eliminating or avoiding their production.<sup>75</sup> The Resolution also represents 'the first legally binding international tool that targeted specifically the proliferation of all types of WMD to non-state actors'.<sup>76</sup> Although focusing on preventing non-State actors' access to prohibited

71 Fooks & Holmstrom (n 10) 630–631.

72 D Feakes, 'The Biological Weapons Convention' (2017) 36 *Revue scientifique et technique de l'Office international des épizooties*, 623.

73 Zanders & Smithson (n 27) 481 see also NA Sims & J Littlewood, 'Ambitious incrementalism', (2011) 18 *The Nonproliferation Review* 503.

74 Zanders & Smithson (n 27) 481.

75 UNSC Res 1540 (28 April 2004) UN Doc S/RES/1540.

76 B Kienzle, 'Effective Orchestration? The 1540 Committee and the WMD Terrorism Regime Complex' (2019) 10 *Global Policy* 487. On the criticism surrounding the role of the Security Council as an international legislator, with specific reference to Resolution 1540, see M Asada, 'Security Council Resolution 1540 to Combat WMD Terrorism: Effectiveness



weapons, Resolution 1540 (2004) generally contributes to the disarmament process by requiring States to establish national controls to prevent proliferation of WMD and their means of delivery.<sup>77</sup> The 1540 Committee monitors compliance with the Resolution and relies mainly on national reports when updating the Security Council on its implementation. According to one scholar, 'working from the reports, national legislation can be identified, patterns discerned, gaps revealed, and even the shortest and most poorly written reports can be indicative of a level of compliance and be a useful source of information'.<sup>78</sup> This mechanism contributes, therefore, to mapping implementation trends that might be relevant for assessing compliance with the CWC and BWC obligations as well.

Finally, the ACDL normative corpus is further complemented by the United Nations Secretary-General's Mechanism (UNSGM), developed in the late 1980s to undertake timely and evidence-based investigations on the use of chemical, bacteriological (biological) or toxin-based weapons.<sup>79</sup> The Mechanism consists in the dispatch by the Secretary-General of missions of experts – selected from a roster of specialists nominated by UN Member States – with the task of ascertaining facts related to an allegation (presented by any UN Member) of the use of such weapons.

The Secretary-General's Mechanism was activated in 2013 in the Syrian Arab Republic, upon request of the Syrian Government, to investigate the 19 March 2013 Khan al-Assal chemical attack, with the assistance of experts from the OPCW and WHO. The Report, delivered in September 2013, also considered the attack that occurred in Ghouta, immediately after the deployment of the mission, and confirmed that chemical weapons had been used on a relatively large scale, including against the civilian population. In the same month, the Syrian Arab Republic signed up to the CWC, while the USA and the Russian Federation reached an agreement to define a framework for destroying all chemical weapons held in that country, exceptionally allowing for the removal

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and Legitimacy in International Legislation' (2009) 13 *Journal of Conflict & Security Law* 322. See ch 7 by Poltronieri Rossetti and ch 25 by Viterbo.

77 D Vitkauskaitė-Meurice, 'The UN-NATO cooperation in implementing the United Nations Security Council Resolution' (2014) 21 *Jurisprudencija-Jurisprudence* 336, 342.

78 A Viski, 'UNSCR 1540: Implementation Trends', in D Salisbury, I J Stewart, A Viski (eds), *Preventing the Proliferation of WMDs Measuring the Success of UN Security Council Resolution 1540* (London 2019) 40.

79 See, in particular: UNGA Res 42/37 (30 November 1987) UN Doc A/RES/42/37C; Report of the Secretary-General on chemical and biological weapons (4 October 1989) UN Doc A/44/561 Annex I; as well as UNSC Res. 620 (26 August 1988) UN Doc. S/Res/620.

of chemical weapons and their destruction outside of Syria.<sup>80</sup> Certainly, in this case, the Secretary-General's Mechanism contributed to launching the disarmament process in Syria. However, despite the success of such a 'complex, multinational disposal operation',<sup>81</sup> which certainly helped to eliminate 'the threat of further large-scale chemical weapons attacks by the Assad regime against the Syrian people and neighboring states',<sup>82</sup> smaller but still lethal chemical attacks have continued in Syria. Moreover, attribution and accountability remain hot topics.<sup>83</sup>

## 5 Concluding Remarks

The Syrian case demonstrates the pitfalls of a disarmament system with limited enforcement mechanisms, combined with the inability of UN sanctions to cope with the use of chemical and biological weapons, in particular, in case of both incidents of low intensity and incidents occurring in areas of very intense conflicts, which present serious difficulties in attribution of responsibility.<sup>84</sup>

This notwithstanding, a wider acceptance of the ACDL normative *corpus* can probably make a significant difference, also in view of the broader non-proliferation regime that has been described. As has rightly been stressed by

80 K Makdisi & C Pison Hindawi, 'The Syrian chemical weapons disarmament process in context: narratives of coercion, consent, and everything in between' (2017) 38 *Third World Quarterly* 1697.

81 A Sanders-Zakre, D Kimball, 'Responses to Violations of the Norm Against Chemical Weapons' (2019) *Arms Control today* <<https://www.armscontrol.org/issue-briefs/2019-04/responses-violations-norm-against-chemical-weapons>>. For details on the operation see: R Trapp, 'The Use of Chemical Weapons in Syria: Implications and Consequences', in B Friedrich, D Hoffmann, J Renn, F Schmaltz, M Wolf (eds), *One Hundred Years of Chemical Warfare: Research, Deployment, Consequences* (Springer 2017) 363.

82 Sanders-Zakre, Kimball (n 81).

83 A number of international bodies have been engaged in investigating alleged chemical weapons use in Syria. The Independent International Commission of Inquiry on the Syrian Arab Republic, established in 2011 by the Human Rights Council, released its Report in September 2018, documenting many chemical attacks, mostly perpetrated by the Syrian government. The OPCW Fact-Finding Mission was established in 2014 to determine if chemical weapons were used in reported attacks, while the OPCW-UN Joint Investigative Mechanism (JIM) was established by UN Security Council Resolution 2235 in 2015 to determine which party was responsible for chemical attacks. In its two years of operation, the JIM issued seven reports and found the Syrian government responsible for four chemical weapons attacks and the Islamic State guilty of two. Finally, in June 2018, a special session of CWC States Parties voted to establish the Investigation and Identification Team (IIT).

84 See ch 26 by Buscemi.

Sims and Littlewood, '[t]hese external mechanisms [...] do assist states to achieve the broader objectives of the regime'<sup>85</sup> established in the BWC and the CWC. The prospective success of the arms control and non-proliferation regime is conditioned by the synergy between the normative *corpus* and 'the wider world in which it operates'.<sup>86</sup>

In supporting the international efforts against the production and use of biological and chemical weapons, a major consideration of the 'normative role' of science and technology within the context of the Conventions is needed.<sup>87</sup> Considering the developments in life sciences and chemistry, timely adaptation of the Conventions provisions is of a keen importance and requires 'a new quality in the interaction between the OPCW and civil society, including chemical industry'.<sup>88</sup> In fact, with respect to these future prospects, the focus of disarmament needs to move from weapons elimination to weapons prevention and this probably requires a renewed engagement with different stakeholders<sup>89</sup> (science, industry, government, but also civil society), in order to reinforce the basis for 'compliance with the safe and responsible conduct and utilization of science'.<sup>90</sup>

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85 Sims & Littlewood (n 73) 501.

86 Ibid.

87 Evans (n 63).

88 Krutzsch, Myjer, Trapp (n 43) 13.

89 Ibid 14. Insisting on the need to support research on biodefence: C M Fraser & M R Dando, 'Genomics and future biological weapons: the need for preventive action by the biomedical community', (2001) 29 *Nature Genetics* 253.

90 McLeish & Trapp (n 2) 540.

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