

# **The Chemical Weapons Convention**

## **Policy and Planning Aspects**

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## Executive summary

This report presents proposals for strategic approaches and directions that the Third Review Conference of the 1993 Chemical Weapons Convention (CWC) could consider in its assessment of the operation of the convention. It places the CWC in a broader context of the current and future international security and technological environment. Additionally, it examines operational and policy issues in the context of the CWC, with a view to informing the scope and focus of the future decisions and activities of the Organisation for the Prohibition of Chemical Weapons (OPCW). Recent research on selected developments in science and technology (S&T) informs this study, together with insights into chemical industry practice, the nature and role of strategic military technologies, and the priorities of and trends in international security policy. This interim report informs a subsequent study that aims to be of lasting interest and relevance to those interested in the CWC regime.

This report focuses on chemical weapon (CW) disarmament; verification of CW non-production; national implementation of the CWC; preparedness and response with regard to releases of toxic chemicals, including the use of chemical weapons; and the impact of advances in S&T on the CW disarmament regime. These topics are briefly addressed in relation to the various processes and institutions of relevance to the OPCW.

The focus is twofold: (a) to compare and contrast the multiple and overlapping institutions and mechanisms that affect the CWC regime, and (b) to assess how they interact with each other and how they can be brought into better alignment with the CWC's core objectives. An example for such alignment and consultation is the evolving relationship between CWC implementation and the World Customs Organization's Green Customs Initiative. Possible future adaptations that would enable the CWC regime to more effectively operate in the broader international security environment are also presented, with a view to policy and operational relevance to the functioning of the OPCW. The study aims to provide a sufficient basis for choosing suitable pathways to ensure and maintain the future relevance of the treaty according to a range of underlying 'visions'.

This report considers important trends that are relevant to the effective implementation of the CWC, and that should be considered in the context of the Third Review Conference. An attempt has been made to look beyond the type of sources and discussion often encountered in standard chemical arms control analyses. It is hoped that this report and the follow-up 2013 study will provide a useful foundation for the further consideration of developments in the science, technology and security environments within which the CWC operates and for assessment of the impact of these trends on CWC implementation.

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## Abbreviations and acronyms

AG	Australia Group
BW	Biological warfare/biological weapon
CBRN	Chemical, biological, radiological and nuclear
CSP	Conference of the States Parties
CTITF	Counter Terrorism Implementation Task Force
CW	Chemical warfare/chemical weapon
CWC	Chemical Weapons Convention
DOC/PSF	Discrete organic chemical/phosphorus, sulphur fluorine
EDNA	Electronic Declaration Tool for National Authorities
ESARDA	European Safeguards Research and Development Association
EU	European Union
HCN	Hydrogen cyanide
ICA	International cooperation and assistance
IUPAC	International Union for Pure and Applied Chemistry
MFA	Ministry for Foreign Affairs
MOU	Memorandum of Understanding
NAM	Non-Aligned Movement
NGO	Non-governmental organization
OCPF	Other chemical production facility
OPCW	Organisation for the Prohibition of Chemical Weapons
PTS	Preparatory Technical Secretariat
RCA	Riot control agent
R&D	Research and development
SAB	Scientific Advisory Board
SAICM	Strategic Approach to International Chemicals Management
SME	Small and medium enterprise
S&T	Science and technology
TS	Technical Secretariat
UNODA	United Nations Office for Disarmament Affairs
WMD	Weapons of mass destruction

# 1. Introduction

States continue to seek to identify and mitigate threats to their national security. The 1993 Chemical Weapons Convention (CWC) is a key aspect the broader international peace and security context. This broader context is continually changing and the convention's relevance (perceived and actual) under these conditions should be maintained.<sup>1</sup> In terms of the broader arms control and disarmament context, some analysts argue that a paradigm shift is occurring from a largely undisputed United Nations framework of rights and obligations agreed among states that reflects the post-World War II and subsequent cold war political circumstances to one where a wide variety of actors whose interests and mandates extend beyond prohibiting or controlling a given weapon system as such. This is reflected by the activity carried out by civil society, academia and industry. Various factors have prompted this change, including a de facto reduced emphasis on disarmament—combined with a stronger emphasis on non-proliferation and consequence management strategies, as well as a psychological shift from the cold war paradigm that viewed arms control in terms of preventing widespread or total destruction emanating from the use of nuclear weapons, and an increased focus on threats from non-state actors.<sup>2</sup> Traditional arms control and disarmament regimes paid little to no attention to operational difficulties that the participants in a regime might encounter in meeting their national obligations, since this was largely considered to be an internal matter for the state.<sup>3</sup> Instruments, measures and treaty regimes have, for at least the past decade, been increasingly discussed in terms of counterterrorism, effective and universal national implementation of international legal requirements, and non-proliferation. This has been accompanied by the rise and spread of new instruments for the control and prevention of prohibited weapons and of oversight mechanisms for the relevant dual-purpose technologies, materials and equipment (e.g. the Proliferation Security Initiative and UN Security Council Resolution 1540 (2004)).

The stronger focus on non-state actor threats in the international peace and security context implies that: (a) military forces are less directed towards those of other states and are instead increasingly focused on domestic and international non-state opponents or on peacekeeping; (b) the threat of violence (at least in the northern hemisphere) is increasingly evaluated according to a diffuse and broader spectrum of threats that includes sabotage, criminal violence and various phenomena that undermine social structures; (c) the cold war arms control paradigm assumes a Westphalian model of relations between states that control their territory, while globalization and other transnational developments tend to undermine or call into question this paradigm; and (d) attempts to allow for a legitimate and proper control and oversight over equipment, technology and materials that can be misused for weapon purposes present a continuing weakness, especially in the

<sup>1</sup> UN Counter Terrorism Implementation Task Force (CTITF) and Working Group on Preventing and Responding to WMD Attacks, *Interagency Coordination in the Event of a Terrorist Attack using Chemical or Biological Weapons or Materials* (United Nations: New York, Aug. 2011), <<http://www.un.org/en/terrorism/ctitf>>; and OPCW, Conference of the States Parties, 'Report of the Scientific Advisory Board on developments in science and technology for the third special session of the conference of the states parties to review the operation of the Chemical Weapons Convention', RC-3/DG.1, 29 Oct. 2012.

<sup>2</sup> Bailes, A. J. K., 'The changing role of arms control in historical perspective', eds O. Meier and C. Daase, *Arms Control in the 21st Century: Between Coercion and Cooperation* (Routledge: London, 2013 [actual: Dec. 2012]), p. 21.

<sup>3</sup> Bailes (note 2), p. 18.

nuclear arms control context (as exemplified by the A. Q. Khan nuclear smuggling network).<sup>4</sup>

It should nevertheless be noted that military forces are still used primarily (or, at a minimum, to a great extent) used as a tool to implement ‘politics by other means’.<sup>5</sup> As such, they still must be capable of facing other military forces, including for traditional force projection purposes. Countering non-state actor threats is an additional task that affects (i.e. shapes) military force structure and doctrine. It should also be noted that there is an increased correlation between ‘proliferation risks’ and the global diffusion of knowledge (as opposed to hardware, material, equipment and infrastructure). This tension poses distinct challenges to the understanding and implementation of arms control regimes. Alyson J. K. Bailes has argued that the principal Western policy response to this changing paradigm is an inherent tension between the arms control model of ‘mutual, balanced or complete arms control and disarmament’ as compared to a ‘non-proliferation culture positing that destructive capabilities are good in certain hands but not in others’.<sup>6</sup>

Such broader concerns, perceptions and tensions will affect the balance and scope of activities carried out under the CWC regime, including in the future when CW stockpiles will have already been destroyed. For example, the legitimacy of at least some of the non-proliferation mechanisms is questioned because coercion is (to varying degrees) implied.<sup>7</sup> More specifically, there is concern that the nature of a given arms control and disarmament regime may be changed from a mutually-agreed disarmament to one where some may continue to possess such weapons, whilst other states abide by the prohibition and are nevertheless obliged to participate in (or are otherwise affected by) control and oversight mechanisms whose implementation is determined by ‘the haves’ (e.g. in terms of technology transfer). This fear may not be justified. However, at a minimum, it reflects mistrust of the intentions of some major actors.

Some parties to the CWC are also reluctant for the regime to take on an explicitly non-proliferation aspect. This concern is reflected by the recent increased use of the term ‘re-emergence’ (e.g. at the 17th Conference of the States Parties in November 2012). Nevertheless, the term ‘non-proliferation’ is commonly used in the OPCW, including in its current medium-term planning documentation.

With respect to operational activity and the mandates of various international actors relevant to the prevention of chemical warfare, the Working Group on Preventing and Responding to Weapons of Mass Destruction Attacks—which is part of the Counter-Terrorism Implementation Task Force (CTITF) established to support the 2005 UN Global Counter-Terrorism Strategy—observed that ‘no one [UN or international] agency can claim overall responsibility for either chemical or biological terrorism preparedness and

<sup>4</sup> Bailes (note 2), pp. 24–25. See also *Nuclear Black Markets: Pakistan, A. Q. Khan and the Rise of Proliferation Networks, a Net Assessment* (International Institute for Strategic Studies: London, 2007).

<sup>5</sup> In a much cited letter, Carl von Clausewitz stated ‘War is not an independent phenomenon, but the continuation of politics by different means. Consequently, the main lines of every major strategic plan are *largely political in nature*, and their political character increases the more the plan applies to the entire campaign and to the whole state. A war plan results directly from the political conditions of the two warring states, as well as from their relations to third powers. A plan of campaign results from the war plan, and frequently—if there is only one theater of operations—may even be identical with it. But the political element even enters the separate components of a campaign; rarely will it be without influence on such major episodes of warfare as a battle, etc. According to this point of view, there can be no question of a *purely military* evaluation of a great strategic issue, nor of a purely military scheme to solve it’. C. v. Clausewitz to C. v. Roeder, 22 Dec. 1827, in *Zwei Briefe des Generals von Clausewitz*, special issue of *Militärwissenschaftliche Rundschau*, (Mar. 1937), p. 6. Cited in Paret, P., ‘The Genesis of *On War*’, pp. 7–8 in von Clausewitz, C. *On War* (Alfred A. Knopf: New York, 1993), edited and translated by M. Howard and P. Paret.

<sup>6</sup> Bailes (note 2), p. 27.

<sup>7</sup> Daase, C. and Meier, O., ‘Introduction’, eds Meier and Daase (note 2), pp. 3–11.



response’.<sup>8</sup> Engaging the various relevant actors in a meaningful manner entails developing and strengthening existing and creating new relationships (e.g. through joint meetings and shared operational protocols) and identifying and implementing operationally relevant activity such as joint training and exercises. On the chemical safety and security side, Jan van der Kolk and Ravi Agarwal have identified various difficulties and operational objectives, including the need to better understand the exposure of vulnerable societal groups to toxic chemicals; the drivers, mechanisms, costs and benefits entailed in the substitution of more hazardous chemicals; and the linkages between political preferences and the technical requirements of sound management of chemicals.<sup>9</sup>

The CWC regime must remain engaged with all relevant actors under its mandate, and maintain and strengthen its institutional capacity and memory. The conceptualizations of the parties concerning the balance and focus of future activity of the regime should be flagged, at least informally, in the lead-up to and during the Third CWC Review Conference, in April 2013. Possible outcomes include: (a) the status quo, defined by implementation practice and the progressive reduction of resources devoted to CW destruction and related verification tasks; (b) an international assistance regime with specialized technical expertise that can be used to support risk assessment, preparedness and response to a variety of chemical threats, including chemical warfare; and (c) a ‘balanced’ approach spread across selected ‘core objectives’. They may also be partly based on OPCW medium-term planning documentation which, in turn, divides the CWC into seven core objectives and observes that chemical threats consist of more than “‘traditional’ chemical warfare with mass casualties’”.<sup>10</sup>

Constructive articulation of an appropriate conceptualization (i.e. ‘visualization’) can be done according to agreed principles on the core objectives of the CWC and in terms of its operational, legal and political relevance to the broader international safety and security context that concerns (directly or indirectly)—amongst a range of risk factors—the prevention of the misuse of toxic chemicals as a method of warfare.

### **CWC regime developments and preparations for the Third CWC Review Conference**

Areas of activity (‘pillars’ or core areas of focus) and how they could be structured were also considered in the context of the 2011 Ekéus Report,<sup>11</sup> the findings of the 2012 OPCW

<sup>8</sup> UN Counter Terrorism Implementation Task Force (CTITF) and Working Group on Preventing and Responding to WMD Attacks (note 1), p. vii.

<sup>9</sup> The challenges include: 1. strengthening the general sustainable development agenda, 2. building stronger linkages between the chemicals agenda and other major development agendas and financing mechanisms, 3. developing and maintaining sustainable relevant financing, 4. the need for capacity building and implementation to narrow the gap between industrial and nonindustrial countries, 5. integration of various relevant international instruments remains weak, 6. conferences of the parties to various regimes reflect undue politicization of technical issues, 7. conferences of parties to various regimes should pay greater attention to implementation matters, 8. illegal trade continues to undermine chemicals management, 9. synergies among inter-governmental organizations are increasing, 10. stocks of obsolete chemicals (e.g. pesticides) pose continuing burdens, 11. sound chemicals management needs to be better integrated into broader good governance and 12. a continuing need to compare different approaches to sound chemicals management. Van der Kolk, J. and Agarwal, R., ‘Future outlook and challenges’ eds P. Wexler, J. van der Kolk, A. Mohapatra and R. Agarwal, *Chemicals, Environment, Health: A Global Management Perspective* (CRC Press: London, 2012), pp. 761–69.

<sup>10</sup> The 7 core objectives are: (a) chemical demilitarisation, (b) non-proliferation, (c) assistance and protection (d) international cooperation, (e) universality, (f) national implementation, and (g) organizational effectiveness. OPCW, Executive Council, ‘Medium-term plan for the period from 2013 to 2015’, EC-70/S/1, 28 June 2012, paras. 4–5, pp. 1–2.

<sup>11</sup> ‘Report of the advisory panel on future priorities of the Organisation for the Prohibition of Chemical Weapons’ [‘the Ekéus report’], OPCW document S/951/2011.

Scientific Advisory Board (SAB)<sup>12</sup> and the forthcoming report of the International Union for Pure and Applied Chemistry (IUPAC).<sup>13</sup>

As of late November 2012, a number of general observations regarding ‘red lines’ and preferred outcomes for the Third CWC Review Conference have been made. For example, final text and decisions must support effective and sustained implementation of Article XI (Economic and Technological Development). Other states parties emphasize the need to improve Article VI (Activities not Prohibited) implementation, or to strengthen the CWC’s verification system, including through better focusing industry verification and by maintaining institutional readiness to carry out a challenge inspection or investigation of alleged CW use.

The scope for agreeing understandings on the proposed use of incapacitants for law enforcement purposes is limited. However, there may be scope to initiate a consultation process on this matter within the OPCW. With regard to sea-dumped CW, an issue that is receiving increased attention, there remain strong limitations on the OPCW’s ability to contribute to these discussions, let alone undertake actual programme activity.

Non-state actor threats will have to be largely dealt with through efforts to achieve full and effective national implementation of the provisions of the CWC and through capacity building efforts, including with respect to the exchange of technical expertise in the fields of preparedness and response.

One important probable ‘red line’ is the unwillingness of some states parties to discuss the post-CW destruction phase of the regime until after such stockpiles have been destroyed. To do otherwise risks reducing the regime’s imperative or sense of urgency to achieve a fundamental purpose (This view is fully shared by one of us. It is understandable and supported to varying degrees by the other three authors). In the context of the 2011 Ekéus Report some parties expressed the view that it is premature to speak of transition and new balances when focusing on future activity while CW stockpiles remain. In 2012 Malaysia reiterated regret for the fact that only 70 per cent of the world’s declared stockpiles have been destroyed.<sup>14</sup> This regret was repeatedly expressed during the 17th Conference of the States Parties (CSP). Also in 2012 India stated that: ‘The dilemma facing the Council and the Organisation is therefore to ensure the timely destruction of the remaining chemical weapons stockpiles while making preparations for the transition period’.<sup>15</sup> Thus an underlying difference in philosophical approach during the lead up to the Third Review Conference will continue to be the extent to which language can be formulated that takes this dichotomy into proper account.

In terms of practical organizational planning, if the transition issues are not taken up in good time and reflected in OPCW operational planning, a protracted reduction of verification demands in the CW destruction field could lead to a de facto ‘thinning out’ of capacity and expertise that could compromise the ability of the Technical Secretariat (TS) to perform other key responsibilities, including in other areas of verification and in the field of assistance and protection.

<sup>12</sup> ‘Report of the Scientific Advisory Board on developments in science and technology for the Third Special Session of the Conference of the States Parties to review the operation of the Chemical Weapons Convention’, OPCW document RC-3/DG.1.

<sup>13</sup> A draft of this report was submitted to the OPCW in late 2012 to help inform its preparations for the Third CWC Review Conference. See note 12. The final report will be published by *Pure and Chemistry* in due course.

<sup>14</sup> ‘Malaysia, Statement by H. E. Dr Fauzia Mohamad Taib, permanent representative of Malaysia to the OPCW at the seventieth session of the Executive Council’, OPCW document EC-70/NAT.8, 25 Sep. 2012, para. 3, p. 1.

<sup>15</sup> ‘India, statement by H. E. Ambassador Bhaswati Mukherjee, permanent representative of India to the OPCW at the seventieth session of the Executive Council’, OPCW document EC-70/NAT.15, 25 Sep. 2012, para. 1, p. 1.

Shortcomings in full and effective national implementation will be another theme evident in the lead up to the Third CWC Review Conference. Fewer than half of the parties have demonstrated that they are fully implementing all key provisions of Article VII (National Implementation Measures) necessary for full national implementation. Malaysia has asked what the implication is when 47 per cent of the parties have fully complied with their Article VII obligations by stating ‘It implies that “anything goes” for the rest of the States Parties that have no laws to regulate the requirements of the Convention. Chemical industries can mushroom without any kind of restrictions, chemical products can come in and out of the country freely, and what is most fearful—chemical weapons can be produced in the said country without the slightest knowledge of the authorities’.<sup>16</sup>

A TS report indicated that ‘since the Second Review Conference, progress in the status of the establishment or designation of National Authorities and the adoption of legislative and administrative measures by States Parties has been steady’. This is encouraging with regard to the level achieved so far for the establishment or designation of a National Authority (99 per cent), but it does not translate into fuller treaty implementation. To achieve progress in this broader area, National Authorities need to have both the legal authority and the capacity to implement the convention and to enforce its provisions. Furthermore, and for the purposes of building further confidence, more efforts should be undertaken by both the OPCW Secretariat and states parties with regard to Article VII (5) submission (75 per cent) as well as with ensuring that the measures adopted by the states parties provide the required scope of coverage of key areas (47 per cent).<sup>17</sup> It should also be noted that this data is self-reported and the reality is probably worse. Therefore, there is a further need for ‘peer review’ among the parties and an exchange of practical experience. The associated capacity building should complement that required for the implementation of UN Security Council Resolution 1540 (2004) and the various requirements in the field of chemical management (e.g. under the Strategic Approach to International Chemicals Management, SAICM).

Another key theme is ensuring that prohibited (including undeclared) CW activity and programmes do not continue in any state party and that any states outside the regime with CW programmes join the treaty and verifiably disarm. In addition, the principle of equal rights and obligations for all the parties, together with the avoidance of casting aspersions on the conduct of parties that may be said to be in good standing as regards their treaty obligations (or cannot be clearly said not to be), are important, and clarifications must be sensitive to them. Clarifications should also be sensitive to the possible cross-linkage of issues and the taking of ‘paths of least resistance’ to reach politically preferred outcomes. Nevertheless, allegations persist of CW use and the continuation of certain CW-related activities, including stockpiling and development. To underscore these concerns the fact remains that Libya did not fully declare its CW holdings when it joined the convention. The completeness of other CW declarations has been publicly questioned. However, no formal clarification process has been undertaken in the OPCW context (i.e. by the

<sup>16</sup> ‘Malaysia, Statement by H. E. Dr Fauzia Mohamad Taib, permanent representative of Malaysia to the OPCW at the seventieth session of the Executive Council’, OPCW document EC-70/NAT.8, 25 Sep. 2012, para. 4, p. 1. For the statistic and related information, see ‘Table 1: status of elements of legislative and administrative implementation under purview of the present report, as at 27 July 2012’, ‘Report by the Director-General, status of implementation of article VII of the Chemical Weapons Convention as at 27 July 2012: article VII(1)(A) to (C) and other obligations’, OPCW document EC-70/DG.3, 28 Aug. 2012, p. 2.

<sup>17</sup> ‘Report by the Director General, status of the implementation of Article VII of the Chemical Weapons Convention as at 27 July 2012: article VII(1)(A) to (C) and other obligations’, OPCW document EC-70/DG.3, C-17/DG.6, 28 Aug. 2012, p. 2.

Executive Council or CSP) to resolve these non-compliance allegations. Questions have also been raised about possible novel types of chemical weapon (e.g. ‘novichoks’, incapacitants and large-calibre munitions for riot control agent, RCA, dissemination).<sup>18</sup>

The OPCW needs to further consider and develop strategies to respond to such broader public concern (e.g. by clarifying the applicability of CWC provisions and the actions of relevant actors to bring those responsible into verified treaty compliance). On 27 November 2012 the OPCW and the UN Office for the Coordination of Humanitarian Affairs (OCHA) signed ‘interface procedures’ for, among other things, the coordination of assistance activities during the response to an emergency involving the use, or threat of use of toxic chemicals as a method of warfare.<sup>19</sup> In 2012 the OPCW and the UN Office for Disarmament Affairs (UNODA) concluded a memorandum of understanding (MOU) on cooperation in cases of investigations of alleged CW use. At least one delegation has expressed the view that the Director-General is not authorized to take action under this MOU until the Executive Council has discussed the matter.<sup>20</sup> The United States has rejected this interpretation.<sup>21</sup> Such an interpretation undermines the longer-term relevance (perceived and actual) of the treaty and is inconsistent with the relevant CWC provisions. Non-governmental organizations (NGOs) and other interested observers should draw attention to such matters.

Yet another theme is the importance of chemical safety and security as a rubric for future activity that can involve (a) engaging with other relevant actors to ensure that the prohibition against CW is maintained and strengthened, (b) supporting a wider and deeper programme of operationally relevant international assistance and cooperation (ICA) activity, and (c) ensuring that the OPCW maintains institutional expertise on appropriate safety and security matters.<sup>22</sup>

Another group of issues concern the implications of developments in science and technology (S&T) for the operation of the convention. How this set of issues is addressed can both facilitate verification, or make some verification tasks more difficult. S&T developments can also affect the balance between offensive and defensive applications of chemical science in war and thus the ‘utility’ of chemical warfare in relation to other forms of military force. They can also create opportunities to further peaceful international

<sup>18</sup> The SAB, for e.g., ‘notes with concern isolated reports of the commercial availability of munitions apparently designed to deliver large amounts of riot control agents over long distances’. ‘Report of the Scientific Advisory Board on developments in science and technology for the third special session of the conference of the states parties to review the operation of the Chemical Weapons Convention’, OPCW document RC-3/DG.1, 29 Oct. 2012, para. 56, p. 14. On the relation between the novichoks described by the former Soviet military chemist Vil Mirzayanov and the CWC’s Annex on Chemicals and the SAB’s limited ability to fully comment on this, see ‘Report of the Scientific Advisory Board on developments in science and technology for the third special session of the conference of the states parties to review the operation of the Chemical Weapons Convention’, OPCW document RC-3/DG.1, 29 Oct. 2012, para. 82, p. 20.

<sup>19</sup> ‘OPCW signs Interface Procedures with UN OCHA’, OPCW press release, 27 Nov. 2012, <<http://www.opcw.org/news/article/opcw-signs-interface-procedures-with-un-ocha/>>.

<sup>20</sup> Established practice of the OPCW is that MOUs entered into by the TS with secretariats of other international organizations do not require the authorisation by the Executive Council. Furthermore, the UN–OPCW Relationship Agreement stipulates ‘The Secretary-General and the Director-General may enter into such supplementary arrangements and develop such practical measures for the implementation of this Agreement as may be found desirable’. Art. XIV, UN–OPCW Relationship Agreement, <<http://www.opcw.org/about-opcw/un-opcw-relationship/>>.

<sup>21</sup> ‘United States of America, ‘US views regarding investigation of alleged use of chemical weapons involving a state not party to the Convention’, OPCW document EC-70/NAT.16, 25 Sep. 2012, p. 1.

<sup>22</sup> See, for e.g., ‘Statement by Ambassador Dr. Jan Borkowski, Permanent Representative of Poland to the OPCW, “Development of the OPCW engagement in chemical safety and security—perspective from Poland”’. Presented at *International Meeting on Chemical Safety and Security*, 8–9 Nov. 2012; Tarnów, Poland; <<http://www.opcw.org/imcss/>>.

cooperation between the parties in the chemical field—recognizing the important role that chemical science and technology play for sustainable development.

## 2. The international security scene

A number of the current and future international peace and security threat perceptions are relevant to the CWC. The convention was formulated before the terrorist attacks on the USA of 11 September 2001 and faces limitations in regard to issues related to such violence. During the CWC negotiations in Geneva the negotiators decided to exclude terrorism-related issues from the international measures to be taken under the convention (particularly with respect to treaty verification).<sup>23</sup> These threats were meant to be addressed through national implementation requirements (Article VII). The reasons behind this approach largely also apply today, with the possible notable exception of how Article X (Assistance and Protection Against Chemical Weapons) can be applied in cases of terrorist threats that involve the use or threatened use of toxic chemicals.<sup>24</sup> The views of the Non-aligned Movement (NAM) and China in the CWC context continue to stress (a) the importance of the cooperation and capacity-building nature of the regime and (b) the need to ensure that any state party obligations in respect to how measures to address terrorist CW threats are to be taken derive from the convention's provisions, rather than being imposed onto the CWC's regime by other international frameworks or requirements.

The advent of new technologies and structural changes in the chemical industry also carry risks. Globally, the chemical industry is witnessing rapid growth, changing market conditions with pressures emanating from factors such as resource scarcities, environmental pressures, globalisation trends, shifts in consumer patterns, demographics and the impact of regulations (e.g. REACH).<sup>25</sup> Chemicals manufacturing is spreading from traditional production locations to other locations such as Asia, Eastern Europe, Latin America and the Middle East.<sup>26</sup>

Questions can be raised about the adequacy of the various safety precautions taken by the industry, particularly the small-scale industry in the developing part of the world. These concerns apply to (a) developing countries with evolving chemical industry, and (b) implementation of safety and security measures by small and medium enterprises (SMEs). SMEs exhibit implementation difficulties globally, including in Western states. In addition, recent discoveries have blurred the distinctions between the chemical and

<sup>23</sup> See, for e.g., Rob de Wijk and Tim Sweijts, 'The threat of terrorist organizations acquiring chemical weapons: the role of the OPCW' in Ed. Ralf Trapp, *Academic Forum, The Hague, 18 & 19 September 2007, Conference Proceedings* (Netherlands Institute for International Relations Clingendael and TNO Netherlands Organisation for Applied Scientific Research: The Hague, 2008).

<sup>24</sup> The NAM and China statement to the 17th CSP noted 'While we acknowledge the contribution of the OPCW to global anti-terrorism efforts through full, effective and non-discriminatory implementation of the Convention, bearing in mind that the OPCW is not an anti-terrorism Organisation, we reaffirm that its primary objective is the total destruction of chemical weapons. The Second Review Conference recalled the independent and autonomous nature of the OPCW. Therefore[,] we continue to hold the firm view that the obligation to implement the Convention has its origin in the Convention itself and not in any extraneous resolution or law. We also believe that it is important that this principle should be reinforced when addressing any related issue'. 'Statement by H. E. M. M. Akhondzadeh, Deputy for International Affairs of [the] Ministry of Foreign Affairs of the Islamic Republic of Iran on behalf of the member states of the Non-Aligned Movement that are states parties to the Chemical Weapons Convention and China at the seventeenth session of the Conference of the States Parties', 2630 Nov. 2012, para. 11, p. 4, The Hague. This statement can be understood as a partial delinking of the CWC implementation from other international efforts to prevent chemical terrorism including, perhaps UN Security Council resolutions 1540 (2004) and 1373 (2001).

<sup>25</sup> Management Centre Europe, 'Global shifts in the chemical industry', <<http://www.mce-ama.com/industry-expertise/chemicals>>. See also Charles River Associates, *Chemical Industry 2020: the Future is Upon Us*, <<http://www.crai.com/>>; and REACH, <[http://ec.europa.eu/environment/index\\_en.htm](http://ec.europa.eu/environment/index_en.htm)>.

<sup>26</sup> See, for e.g., Chemical Industry: Managing Global Changes, *Executive Issue*, no. 37 (2011). See also 'Developing your people to deal with global changes in the chemical industry', <<http://www.mce-ama.com/executive-issue-38-chemical-industry-2012>>.

biological production processes, at least in certain fields (e.g. the manufacturing of biofuels based on renewable resources, the development of new types of platform chemicals, and the synthesis of certain pharmaceuticals and pesticides).<sup>27</sup> These factors pose questions regarding the verification of the chemical industry. Such factors also increase the number of options that could become available to terrorist organizations and make their use easier. In cases of unregulated industrial growth, the number of industrial accidents and incidents of sabotage that occur could also increase.

Modern trends in the chemical industry also require attention. Smaller facilities that are able to flexibly switch between the manufacture of different kinds of chemicals pose a potential CWC verification challenge. The CWC permits OPCW inspections of declared chemical production facilities that do not produce chemicals listed on the CWC's Annex on Chemicals. The OPCW conducts such inspections, in part, so that they may act as a deterrent. Such inspections need to cover concerns related to the potential for the production of CW (traditional CW and novel agents). To an extent, they also help to address the potential for diversion by non-state actors (e.g. terrorists and criminals) of existing toxic chemicals.<sup>28</sup> (The possible improvised production of CW agents by non-state actors is more a domestic law-enforcement matter, than an international verification and inspection matter.)

The importance and attractiveness of the CWC regime in the current international, regional and national security contexts focus on several areas (including arms control and disarmament) that are useful and effective instruments to restrict and control the spread of WMD. The non-discriminatory nature of the CWC is its greatest virtue. But as the CW stockpiles dating from the cold war-era are being eliminated, the convention finds itself struggling with maintaining relevance in the evolving security environment. This is partly a consequence of increased terrorist threats (and threat perceptions), as well as the implications emanating from changes in S&T.

<sup>27</sup> Jacoby, M., 'Teaming up for biobased chemicals', *Chemical & Engineering News*, vol. 90, no. 32 (6 Aug. 2012), pp. 37–38.

<sup>28</sup> The SAB observes 'While the few instances of the release of toxic chemicals by non-State actors have used crude devices, spray and fogging devices developed by the pesticide industry or developed for veterinary treatment of large-scale animal farms are of concern'. 'Report of the Scientific Advisory Board on developments in science and technology for the third special session of the conference of the states parties to review the operation of the Chemical Weapons Convention', OPCW document RC-3/DG.1, 29 Oct. 2012, para. 56, p. 14. The 'Mubtakkar device' is perhaps the most widely cited such crude device. Garrett, B. C. and Hart, J., *Historical Dictionary of Nuclear, Biological, and Chemical Warfare* (Scarecrow Press, Inc.: Lanham, Maryland, 2007), pp. 142–43.

### 3. Science and technology

Broadly speaking, technology advances in the chemical industry are increasingly driven by three main market demands: food production, energy production and reaction to global warming. Other S&T drivers relate to ‘green’ chemicals manufacturing and the demands for alternative (i.e. sustainable) feedstocks for chemicals production. The S&T associated with each of these activities should be evaluated periodically in terms of their potential contribution to any possible re-emergent technology base that could be misused for CW activity or programme. Such evaluations can draw on the practice of defence and security acquisition analyses, economic indices and related analytical techniques that help to elucidate the nature and direction of S&T capacity and application.

While it is recognized that the increasing convergence between chemistry and biology is of direct relevance to the CWC, it is principally the advances in technology (namely the developments in process chemistry and chemical process technology) that would have a measured impact on the CWC verification regime. In other words, these advances could reduce some of the accumulated confidence in the current industry verification regime, as well as national oversight of existing and conventional technologies. Consequently, input from the scientific and industrial communities could improve the implementation of the treaty and provide additional safeguards to the object and purpose of the CWC (e.g. with respect to scope, focus and level of intensity of verification measures). It is now well understood that the definition of ‘production by synthesis’ of discrete organic chemicals (including those that may contain phosphorus, sulphur or fluorine—DOC/PSFs) could pose a threat to the convention if the term were to be understood to exclude biological or biologically-mediated reaction process. At the same time, if biological processes were included in the routine industry verification regime, the states parties should agree an understanding on the limits of the verification. For example, are transgenic plants grown as the feedstock for biological production of certain chemical products part of a declarable chemical production facility?

Similarly, new trends in chemical production or processing together with developments in process configuration could affect the implementation of the CWC. Wider use of versatile, multipurpose production or processing facilities may render verification of production of Schedule 1 chemicals more difficult to achieve. Furthermore, new developments in catalysts (traditional catalysts, as well as biocatalysts—enzymes) can have a variable chemical selectivity in production pathways in which toxic chemicals appear under different (i.e. non-traditional) process conditions.

Microreactors can have a dedicated (i.e. geared towards a single product or group of related products) or multipurpose (modular) configuration. They typically operate continuously and can be configured to produce, in a safe manner, significant quantities of toxic chemicals (Schedule 1 and Schedule 2) that could be more difficult to recognise in the conduct of verification procedures as compared to technologies known from the past. It is possible that Schedule 3 chemicals can be produced in microreactors.<sup>29</sup>

#### Verification of the chemical industry

With regard to declarations, major efforts accomplished since the First and Second Review Conferences (held in 2003 and 2008, respectively) relate to the expanding use of the

<sup>29</sup> Lerou, J. J., ‘Microreactors find new niches’, *Chemical Engineering* (Mar. 1997), pp. 30–33.



Electronic Declarations Tool for National Authorities (EDNA), rather than submission of paper declarations which the TS then had to transform into a digital format for verification and reporting purposes.

It is clear that, after 15 years of operation and in the light of the number of industry inspections carried out so far at Schedule 1, 2 and 3 facilities and at other chemical production facilities (OCPFs), a solid record that provides confidence has been established. In particular, Schedule 1 facilities (i.e. those producing—but not necessarily consuming—small quantities of Schedule 1 chemicals) have been subject to high frequency of inspection. Whilst this inspection intensity correlates with the high risk that the convention attributes to Schedule 1 chemicals, the facilities themselves often only pose a moderate or small risk to the object and purpose of the CWC. Consequently, together with the high-level of confidence building so far attained during these inspections and the high frequency of inspection implemented, a ‘risk category’ approach to these Schedule 1 facilities could be recommended that has been elaborated and considered for the purpose of reducing inspection numbers at facilities that are perceived to pose a higher risk, while monitoring all facilities through rigorous declaration regime and data monitoring.

The 14th CSP took a decision on low concentration declaration thresholds (C-14/DEC.4). However, it has not been fully implemented. The main issue here is that scheduled chemicals are traded and used in mixtures. So long as the states parties use different rules for calculating the data in their declarations (or do not include such mixtures at all), the CWC will continue to be implemented unevenly in this area. Furthermore, reported imports and exports not infrequently fail to correlate. The TS is circulating a second survey to request parties that have not confirmed their implementation of this decision to inform the TS of the status of its implementation by 31 December 2012.<sup>30</sup> Gradually, the data calculation methodologies and reporting should become more harmonized, partly through implementation practice.

For facilities producing, processing and consuming Schedule 2 precursors, a risk assessment methodology has been applied in the past by the TS that is based on a concept adopted by the CSP in 1997 and subsequently simplified taking into account practical experience. Given the considerable number of Schedule 2 facilities inspected to date, this methodology could be revised using ‘on-the-ground’ knowledge of these facilities, their configuration, capabilities and related factors. In this case, a ‘risk category’ approach may be devised, taking into account such aspects as the ‘multipurpose’ feature of some facilities that would pose a higher risk to the object and purpose of the convention. Over time this could lead to a reduction of inspections, while still maintaining a robust declaration and data monitoring regime.

At Schedule 3 facilities, 356 inspections have been carried out so far, with all facilities having been inspected at least once. A higher frequency of inspections has occurred at facilities that produce Schedule 3A chemicals (toxic chemicals).<sup>31</sup> Thus far, compliance verification through on-site inspection has resulted in the attainment of a high level of confidence. An appropriate frequency of inspection that takes into account the configuration and flexibility of these facilities, as established in previous inspections, in particular for facilities that produce Schedule 3 chemicals, should be maintained.

<sup>30</sup> ‘Second survey on the implementation of decision C-14/DEC.4: guidelines regarding low-concentration limits for declarations of Schedule 2A and 2A\* chemicals’, OPCW document S/1040/2012, 18 Sep. 2012, para. 5, pp. 1–2.

<sup>31</sup> Working Group for the Preparation of the 3rd Review Conference in ‘Note by the Secretariat, Review of the Operation of the CWC since the 2nd Review Conference’, OPCW document WGRC-3/S1, 5 Oct. 2012.

The regime for OCPF facilities is perceived to be a confidence-building verification regime. This is expressed through the limited scope of data monitoring of facility information included in declarations (which limits the value of the data monitoring) and by using product group codes to indicate the facilities' main activities—not a list of chemicals, as is the case for the other regimes. In addition, many facilities that are subject to on-site inspection are dedicated plants. On the other hand, the TS has estimated that amongst the DOC facilities, approximately 10 per cent pose a relatively high risk to the object and purpose of the convention given their technological features (multipurpose, use of corrosion-resistant equipment, etc.) and the chemicals they manufacture (with chemical processes closely associate with those known from traditional CW programmes—e.g. certain pharmaceutical plants and pesticide producers).

So far, about 25 per cent of OCPFs have been inspected through a random selection process, taking into account declaration information that might indicate the technological potential of the facility (e.g. the product group code to which the chemical or chemicals belong). As in the case of the facilities involved with scheduled chemicals, a 'weighted risk category' methodology is foreseen by the convention. Such a methodology, however, would require either providing some additional detail on the facilities in the declarations, or allowing the TS to use information other than the data contained in the declarations (such as information from previous inspections, open source data from authoritative sources, or data voluntarily provided by states parties on their facilities). States parties might agree a procedure for submitting proposals for selecting plant sites for inspection in accordance with Part IX, para. 11(c) of the Verification Annex.<sup>32</sup> However, this is controversial and unlikely to occur anytime soon.

Another alternative that could perhaps be explored is to extend the exemptions from the declaration requirements under the DOC regime (currently applied to facilities that exclusively produce explosives or hydrocarbons) to exempt other types of chemical plant sites that exclusively produce certain product types and where the present inspection record clearly shows that these facilities are of little to no relevance to the convention (e.g. urea or methanol plants).

In short, the options for enhancing the efficiency of the DOC verification regime incrementally (i.e. by tweaking the current selection methodology) have been all but exhausted. So long as the states parties are not prepared to consider more drastic steps (e.g. agree exemptions to decrease the number of declared facilities, increase the scope for the TS to use data originating from outside declarations, or to add data points to the declarations), the difficulties inherent with the current industry verification regime and practice will remain sub-optimal (e.g. in terms of focus and efficiency).

<sup>32</sup> 'Under this Section, the Technical Secretariat shall randomly select plant sites for inspection through appropriate mechanisms, such as the use of specially designed computer software, on the basis of the following weighting factors....Proposals by States Parties on a basis to be agreed upon in accordance with paragraph 25'. CWC, Verification Annex, Part IX, para. 11. Paragraph 25 of Part IX of the Verification Annex states 'At its regular session in the third year after entry into force of this Convention, the Conference, upon advice of the Executive Council, shall decide on which basis (e.g. regional) proposals by States Parties for inspections should be presented to be taken into account as a weighting factor in the selection process specified in paragraph 11'.

## 4. Preparedness and response

The CWC contains provisions that deal with preparedness and response to CW use and the threat of use. With regard to preparedness, these provisions include the right of the parties to protect themselves against CW attack and urge international cooperation among the parties in the field of chemical protection. The OPCW may also provide expert advice on enhancing protective capacity. With regard to response, the OPCW has put in place a mechanism for investigation of alleged use procedures and provides measures to deliver and coordinate assistance to the states parties that fall victim to such weapons.<sup>33</sup> These provisions were originally included in the CWC with the use or threat of use of CW in armed conflict in mind. This continues to be an important consideration in certain regional settings where military arsenals with CW still exist (e.g. in non-party states with CW capabilities, such as in the Middle East or on the Korean Peninsula).

Today preparedness and response are viewed in a wider context that includes (a) chemical, biological, radiological and nuclear (CBRN) weapons, (b) armed conflict and also the use of such materials by non-state actors (e.g. terrorists and criminals), and (c) overlapping preparedness and response mechanisms to counter deliberate releases of chemicals and at the same time deal with natural events or industrial or transportation accidents.

At the national, and sometimes regional level, states are increasingly taking a comprehensive ‘all-risks, all-governments’ approach. These solutions also envisage private-public partnerships. An example of this approach is the EU CBRN Action Plan.<sup>34</sup>

In the two previous review conferences the OPCW has already publicly recognized that it has a contribution to make with regard to assisting the parties to strengthen their response capacities (amongst others with reference to terrorist threats to chemical facilities). The Third Review Conference offers an opportunity to further define this role and to clarify what the OPCW can or should be doing, as well identify its limits with regard to mandate, expertise, capacity and the like. This should be part of the wider conversation about the OPCW’s possible role at the nexus of chemical safety and security.

Also, regarding response, the OPCW is not the only international body with a clear mandate in this field. A range of international organisations and agencies within the UN system, as well as regional organisations do, however, have such mandates. In addition, there are a variety of military mechanisms and capacities that are beyond the purview of this report. It may also be advisable to develop strategic relations or understandings with various NGOs that carry out fieldwork (for emergency relief or development). This implies the further development of legal and regulatory frameworks (where needed) and the elaboration of protocols for operational coordination, consultation and training.

With regard to broader international collaboration in preparedness and response, the OPCW needs to move away from ad hoc to systematic and sustainable approaches. This can include identifying and maintaining contact with key partners, such as OCHA,

<sup>33</sup> Hart, J., ‘Political and technical aspects of challenge inspections under the Chemical Weapons Convention’. Paper presented at *EU Seminar on ‘Challenge Inspections’ in the Framework of the CWC*, 24/25 June 2004; Vienna. Conference organized by Austrian MFA.

<sup>34</sup> The EU CBRN Action Plan was adopted in 2009. Another element of the EU’s CBRN risk mitigation strategy is the 2010 launch of the EU CBRN Centres of Excellence (COE) which are being created in order to enhance relevant institutional capacity in five regional centres: (a) North Africa, (b) the ‘Atlantique Façade’, (c) the Middle East, (d) South-East Europe-Southern Caucasus-R.Moldova-Ukraine and (e) South-East Asia.

UNODA and the World Health Organization. Administrative and technical mechanisms also need to be in place to allow this contact to function effectively.

A better understanding by the parties themselves is needed. This need and its benefit to the parties could be contrasted with the consequences of just carrying on as they do today. Other areas for discussion could include legal and political uncertainties and misunderstandings (e.g. the situation in Syria and the chaos and humanitarian tragedy that would result were CW used).<sup>35</sup> Additionally, an understanding ought to be reached on how to address the actual use of CW and a determination made of what would be needed and available to respond to such a situation. Current NATO efforts to maintain and develop CBRN ‘reach back’ capabilities may be relevant in this regard.

Preparedness and response are not merely administrative, legal or government-driven topics, but issues that involve other stakeholders and include building a security culture in the chemical field, including in industry, research and academia. The potential for activity for the OPCW is not merely associated with the application of Article X of the convention, but also relates to what can be achieved under Article XI. The types of activity by the OPCW in this field could range from providing a platform (a space) for discussion and exchange of experience in order to facilitate cooperation and assistance between states parties to practical work in the field. How far this can be stretched will depend on the actual knowledge base, expertise and capacity that the TS will be able to maintain and develop, as well as on the resources and political support that states parties are able to agree on. The Third CWC Review Conference faces strategic choices in terms of considering where and how decisions can be taken, priorities identified and future direction.

<sup>35</sup> The USA expressed support for the DG with regard ‘contingency planning and operational readiness’ of the OPCW should a party in the region request assist if it believes CW have been used against it and in terms of the DG’s willingness to put his organization’s resources at the disposal of the UN Secretary-General in case allegation of CW use are made by a state not party to the CWC. ‘United States of America, Statement by Ambassador Robert P. Mikulak, United States delegation to the OPCW at the seventieth session of the Executive Council, OPCW document EC-70/NAT.13, 25 Sep. 2012, p. 3. The USA expressed nearly identical views in its opening statement to the 17th CSP. ‘Statement by Ambassador Robert P. Mikulak, United States Permanent Representative to the 17th session of the Conference of the States Parties, the Organization for the Prohibition of Chemical Weapons’, 26 Nov. 2012, The Hague, p. 3.

## 5. The way forward

The Third Review Conference may further consider possible decisions on matters of substance, as well as processes.

At the time of the First Review Conference many of the operationally relevant implementation matters identified by the 1993–1997 Preparatory Commission remained unresolved. To a significant degree, this has changed. One major focus of activity for the CWC regime following the Second Review Conference was an attempt to achieve universal membership and to establish and implement criteria for effective national implementation of all of the CWC's main provisions. This included ensuring that all of the parties informed the TS about their National Authorities. The focus on full and effective national implementation continues. However, this process is incomplete and not sufficiently developed. Thus a new phase of Article VII implementation is about to occur. The relevant actors have been identified and a 'network' in effect now exists that should be more fully utilized.

Verification concepts should be revisited in light of the inspections carried out, the databases on facilities, and their focus and operation. Some classes of chemicals, such as methanol and urea producers, need not necessarily be subject to established routine declaration and verification procedures (in terms of being either declared, or routinely inspected).

The Third Review Conference will probably not be in a position to significantly change the strategic direction of CWC implementation. In order for this to occur, more conceptual discussions would be needed before states parties can achieve broad consensus on how the regime should proceed. This sort of consultation has largely not occurred due to a more general 'conservatism', which seeks to avoid unnecessary discord, as well as a general tendency by the parties to limit the cost, scope and level of intrusiveness of the regime to what was sufficient for effective treaty implementation in the past. The Third CWC Review Conference could more feasibly (and practically) represent the start of such a 'strategic conversation'. This conference has the potential to open avenues for consultation among the parties on selected topics with external input. Simultaneously, the conference should avoid taking decisions that may preclude future beneficial (or possibly beneficial) adjustments and changes in direction. Such hindering actions (or other unfortunate effects) can be caused by the decision-taking process itself. It can also occur by implication if such a decision adversely affects the capabilities of the TS.

### Conclusions

The CWC regime requires continued political and technical support and engagement to ensure its future international security relevance. At a time of asymmetric threats, the greatest security challenges may arise from unlikely sources. The Third CWC Review Conference offers an important opportunity to ensure that the treaty remains fully supported in order to achieve all of its core objectives.

# Annex A. Select options

**Table A.1.** Possible Third Chemical Weapons Convention Review Conference options for decisions and activities

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## Decisions

### *Verification*

Initiate interdisciplinary expert study (government experts, industry experts, academics, research scientists, Scientific Advisory Board, SAB, and Technical Secretariat, TS) to prepare analyses and recommendations on: (a) options for the possible evolution of the industry verification system (e.g. is there a way of tweaking the other chemical production facility regime so that it can deal with new S&T and industry developments to ensure better focus and to deal with chemical and biological, CB, convergence?), (b) the ability and capacity of the regime to investigate compliance issues related to non-traditional agents, and (c) attribution issues (e.g. where does the Organisation for the Prohibition of Chemical Weapons, OPCW, lack experience and technical capacity? Can the OPCW serve as a platform for international collaboration to develop such a capability?).

### *National implementation*

Encourage the parties to: (a) complete their legislative work to create the necessary domestic legal, regulatory and administrative framework to ensure full CWC implementation, (b) institute domestic mechanisms that will enable them to adapt existing regulations and administrative measures to changing requirements emanating from S&T and industrial developments, (c) undertake efforts to share experience concerning the involvement of stakeholders to ensure CWC compliance (internal compliance mechanisms in industry, professional codes of conduct, oversight mechanisms in research and development, R&D, outreach, awareness raising, and education), (d) take part in exchanges and discussion among the parties to identify and propagate ‘best practices’ of CWC implementation, and (e) encourage the TS to continue to work with the parties to provide legislative and practical implementation assistance to the parties that require this, as well as to render support to the remaining parties—if and when they prepare for CWC accession.

### *S&T monitoring*

Encourage the TS to strengthen its S&T monitoring functions to include regular ‘horizon screening’ exercises as well as responding to requests for S&T advice on issues emanating from CWC implementation,

Enhance working relations with the Biological and Toxin Weapons Convention community (e.g. organize and participate in joint expert working relations with this community in order to further clarify the implications of CB convergence for the two treaty regimes),

Further ‘institutionalize’ the working relationship between the International Union for Pure and Applied Chemistry and the SAB.

### *Article X and XI*

Initiate systematic review of relevant domestic, regional and international CBRN ‘reach back’ capability.

Review lessons-learned from current Biological and Toxin Weapons Convention Implementation Support Unit database project compiling offers and requests for assistance.

Develop further operational links with other international agencies having relevant mandates in the field of preparedness and response (including investigation of alleged CW use).

Consider how the OPCW could function as an enabler of cooperation and exchanges between states parties in the field of chemical safety and security.

## Other

### *Industry*

When (to what extent or whether at all) should facilities be included that use ‘non-traditional’ technologies for chemicals manufacturing (e.g. farming using transgenic animals or plants, followed by extraction,

chemical modification and purification. Should (certain) fermentation facilities that use transgenic organisms for chemical manufacturing be covered by routine declaration and verification system? What parts of the food industry should be covered, if any?)

In future, the chembio industry may look to extend life sciences industry confidentiality to itself, given smaller production runs, higher R&D costs and higher confidential business information vulnerabilities.

Are large-scale production facilities susceptible to effective CWC verification? If not, what are the procedural, legal and political implications?

If severe limits are placed on what verification can actually deliver (or how it is being performed) in future, what are the alternatives? What can be done to create a broader 'web' of deterrence and compliance?

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*Source:* Compilation by the authors.

## About the authors

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he joined the Technical Secretariat of the OPCW, where he worked in the areas of industry verification, verification policy and review, international cooperation, government relations and political affairs, and strategic planning. He was intimately involved in the establishment and initial operation of the Technical Secretariat's International Cooperation and Assistance branch, which is responsible for much of the regime's activity in the area of economic cooperation and development. He was a main contributor to the preparation and conduct of the First and Second CWC Review Conferences and also served as secretary of the OPCW's Scientific Advisory Board. Since leaving the OPCW in 2006, he has worked as an OPCW consultant and as legal coordinator of the first European Union Joint Action in support of the Biological and Toxin Weapons Convention. He participates in this study in his personal capacity and the views expressed are those of the co-authors collectively.