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Maintaining the Effectiveness of the Chemical Weapons Convention

On 28 April 2003 a Special Conference of the States Parties to the Organisation for the Prohibition of Chemical Weapons (OPCW) will be convened to review the implementation of the 1993 Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (Chemical Weapons Convention, CWC) and to take into account new, relevant, scientific and technological developments. Whatever specific points may be considered, this Conference needs to address two underlying issues: States Parties' long-term interests in continued participation in the OPCW regime; and how the treaty's effectiveness can be maintained and enhanced given the latest shifts in the security environment (including the new urgency of counter-terrorist efforts), current political and financial realities and the fast pace of technological change. These can best be tackled if the Conference focuses its attention on a small number of manageable, well-conceptualized issues. Otherwise there is a risk that the Conference could become bogged down in open-ended discussions on a myriad of unresolved operational implementation issues. This paper is intended to inform such a conceptualized approach. It was prepared at SIPRI by John Hart, Frida Kuhlau, Ronald Sutherland and Jean Pascal Zanders. It was edited by Andy Mash.

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1. Background

The Chemical Weapons Convention was opened for signature in January 1993 and entered into force on 29 April 1997. As of 1 October 2002, 147 states have ratified or acceded to the CWC and another 27 have signed but not ratified it.[1]

The CWC and the OPCW

Upon entry into force the CWC established the Organisation for the Prohibition of Chemical Weapons: a permanent international body whose membership consists of all States Parties to the CWC. Its principal task is to oversee the implementation of the convention. The OPCW consists of three bodies or 'organs': the Conference of the States Parties (CSP), the Executive Council (EC), and the Technical Secretariat (TS).

The Conference of the States Parties consists of all the parties to the CWC and is the highest decision-making body of the OPCW. All members have one vote (provided that they have met certain treaty obligations, including timely financial payments). The CSP meets annually in regular session. The CSP may also meet in special session. Special sessions may be convened if so decided by the CSP, at the request of the EC, following a request by a State Party with the support of one-third of all States Parties, or as a review conference (CWC, Article VIII, para. 12). The CSP may also be convened in the form of an amendment conference (CWC, Article XV, para. 2).

The Executive Council is composed of 41 States Parties, whose membership rotates every two years. EC membership is distributed according to five geographical regions, whereby each regional grouping selects a treaty-specified number of states. During the selection process, each group takes a number of factors into consideration such as the significance of group members' chemical industries.

Maintaining the effectiveness of the CWC

The Technical Secretariat assists the States Parties and the EC as required and implements the verification provisions in the CWC. Its headquarters are in The Hague, the Netherlands, and it is led by a Director-General. The TS liaises with the National Authorities (NA), which each State Party must establish in order to oversee the national implementation of the CWC and to collect and transmit the required data to the TS (CWC, Article VII, para. 4, Article VIII, paras 37 and 38).

The review conference

According to the CWC, 'The Conference shall not later than one year after the expiry of the fifth and the tenth year after the entry into force of this Convention, and at such other times within that time period as may be decided upon, convene in special session to undertake reviews of the operation of this Convention.' (Article VIII, para. 22) After the second treaty-specified review conference, which must occur no later than one year after the tenth anniversary of the entry into force of the CWC (2007), further review conferences are to be held at five-year intervals, unless the CSP decides otherwise.

The principal purpose of the review conferences is to conduct a comprehensive evaluation of the political, legal and technical aspects of the CWC. Part of this exercise is backward-looking—to evaluate the operation of the convention during the preceding five years. The other part is forward-looking—to identify the most urgent issues that the CWC is likely to face over the next five years and, if necessary, to establish or modify mechanisms and procedures to deal with them. During the review the CSP must consider any scientific and technological developments relevant to the CWC. It must also formulate recommendations to improve the effectiveness of the verification regime for the chemical industry based on a thorough review of the relevant treaty provisions in the light of acquired experience.[2]

A review conference cannot function as an amendment conference. The latter, which has specific decision-making powers and procedures, can only be convened according to treaty-specified steps (CWC, Article XV). Nevertheless, the review conference may recommend the amendment of certain CWC provisions and decide to convene a future amendment conference.

This policy paper discusses selected aspects of the implementation of the CWC, highlights some of the problems, and suggests strategies to deal with them. Section 2 focuses on the question of universality and the CWC. It identifies some of the benefits of universality but argues that the goal may also entail some security risks in the long run. In order to maintain the active commitment of all States Parties to the convention it is imperative that the treaty provisions relating to emergency assistance and international cooperation are properly and credibly implemented, and to make the general purpose criterion more effective in the day-to-day implementation of the CWC. Section 3 explores universality more closely by focusing on the national implementation of the CWC and the tasks the States Parties must carry out to strengthen the effectiveness of the CWC regime. While the OPCW can assist States Parties to meet their individual obligations, the primary responsibility for ensuring that they are met rests with each State Party. Technological developments are discussed in Section 4. They present a particular challenge in that, if not properly considered and dealt with, they could make the CWC obsolete in a relatively short time span. Here, too, making the general purpose criterion operational is of paramount importance. Section 5 reviews the verification regime of the CWC, assesses its effectiveness and suggests areas for improvement. Section 6 contains the conclusions and summarizes the recommendations.

2. Universality

The Chemical Weapons Convention is an international agreement open to all states without exception (Articles XVIII, XIX and XX). It establishes a comprehensive prohibition against the acquisition, possession and use of chemical weapons (CW) regardless of circumstances, including armed conflict. Parties to the CWC may not make any reservations with regard to this prohibitory norm (Article XXII). While the CWC makes no direct reference to the concept of universality, the objective of universal adherence follows from the goal in the preamble to exclude the use of CW through the implementation of the CWC provisions 'for the sake of all mankind' (Preamble, para. 6). Universality was the clear aim of the negotiators

and some measures, such as limiting some transfers of scheduled chemicals to non-States Parties, were proposed with the aim of encouraging universal adherence.[3] Furthermore, the negotiators constructed the CWC in such a way that a state cannot claim legal rights under the convention (such as the right to import and export scheduled chemicals from or to a State Party, to request and receive emergency assistance, or to benefit from international cooperation or technological exchanges under the convention) until it has undertaken the treaty obligations.[4] The reservation of these rights to States Parties serves as a penalty to states remaining outside the CWC and as an inducement for them to join. The cost of staying outside the treaty rises as the number of parties to the convention increases because, especially with respect to the transfer of scheduled chemicals, the scope for non-States Parties to obtain such compounds is progressively reduced.

Since its second session in the autumn of 1997, the CSP has consistently emphasized the importance of universality and has called upon states that have not yet done so to ratify or accede to the CWC. The TS has developed several types of outreach programmes to increase awareness of the importance of the CWC among non-States Parties. These activities have contributed greatly to the large number of parties to the convention.

Nonetheless, the experience acquired during the first five years of operation of the CWC has raised important questions regarding the concept of universality. These questions relate to the amount of resources the OPCW should invest as well as to the development of sound strategies and political commitment by key member states in order to achieve the ratification of states that are reluctant to join the CWC, because they believe that global disarmament treaties do not adequately address their regional security threats; the quality of the participation of States Parties in protecting the world from CW in future, as reflected in the quality of national implementation legislation and the interaction with the TS; and the long-term relevance of benefits extended to States Parties, such as emergency assistance and international cooperation.

Concepts of universality

Universality has a quantitative and a qualitative dimension. The quantitative dimension refers to the number of independent states that adhere to a particular global treaty. The qualitative dimension refers to the depth of the involvement of States Parties in the implementation of the CWC, which is necessary for the global treaty to remain relevant to all parties in the future.

Quantitative universality directly relates to the strength of the norm established by an international treaty. For a global agreement such as the CWC, which has clear security implications for each participant, ratification by all states would be the ideal. However, no global treaty has ever attracted universal adherence. Not every independent state is even a member of the United Nations. While absolute universality appears unattainable in practice, a high number of ratifications and the speed with which this number is achieved has important consequences for the states that remain outside of the treaty. In particular, the consistent practice of the large group of States Parties to the convention could eventually make the relevant provisions of the CWC part of international customary law, and thus binding on all states irrespective of whether they have joined the convention.[5]

Some states currently outside the CWC are of CW proliferation concern. Most are located in regions with deep-rooted conflicts (central and southern Africa; north-east, south-east and central Asia; and the Middle East). Many feel that they cannot afford to abandon the CW option in spite of the sanctions contained in the CWC and the security benefits that would result from accession. Whether their unwillingness to join the treaty reduces the effectiveness of the CWC is unclear. Their joining the convention could cause problems for the treaty regime if such states continued to be suspected of violating the core prohibitions of the CWC and if the verification instruments of the convention were unable to resolve such concerns unambiguously. Furthermore, their membership of the OPCW could deprive the international community of alternative means (e.g., the range of coercive options available to the UN Security Council) to deal with suspected or actual noncompliance. The perception that the CWC cannot offer such states sufficient security guarantees to enable them to join requires careful study.

Finally, quantitative universality or near-universality may give rise to the so-called universality paradox, whereby a state may decide to remain outside the CWC because it believes that it

can acquire a major comparative advantage over the parties to the convention by retaining or expanding its CW arsenal, or whereby a State Party decides to defect from the treaty in order to obtain a similar gain. Such possibilities would largely depend on the specific geopolitical context at any given time.

These possibilities underscore the critical importance of those provisions in the CWC that provide States Parties with security guarantees in the case of a threat or actual use of CW (Article X), because they greatly reduce the advantage a country might hope to gain by staying outside of or leaving the treaty.

The CWC is of unlimited duration (Article XVI, para. 1). This implies that questions regarding universality are relevant not only to the present, but also to the medium- and long-term. This perspective adds an important qualitative dimension to the concept of universality. The political, security and technological contexts in which the CWC must operate change constantly. Significant developments in the international security environment since the conclusion of negotiations on the CWC include: the greater relative importance of regional security over global security since the end of the cold war; acts of terrorism with chemical agents; the changed nature of terrorism in general and its impact on countries' threat perceptions and responses; new demands for and expectations of development from a globalizing economy; and the acceleration of product and process innovation in chemistry and its industrial applications. The nature of the CWC will also change considerably once the declared CW stockpiles have been destroyed.[6] The verification of the chemical industry, the monitoring of the transfer of toxic chemicals and the organization of international cooperation will then be among the central activities of the OPCW. Irrespective of the motivations countries had at the time of becoming a State Party, the changes in the international context and progress in the implementation of the CWC will generate different expectations from the convention.

The future relevance of the CWC to all States Parties will depend greatly on the extent to which the OPCW can uphold the core prohibitions in the light of technological changes and adapt the instruments and procedures envisaged by the negotiators to emerging challenges and expectations.

The general purpose criterion

Most of the technologies required for the manufacture of CW have so-called 'dual-use' characteristics, because they also have legitimate civilian applications. As the CWC does not seek to interfere with scientific and economic activities in the field of chemistry, it uses the 'general purpose criterion' (GPC) to distinguish between the legitimate and prohibited applications of technology. Therefore, it is not the technologies themselves, but the purposes to which they may be applied that are prohibited under the convention. The GPC considers any toxic chemical as a CW except where 'intended for purposes not prohibited' under the CWC 'as long as the types and quantities are consistent with such purposes'. The CWC identifies certain technologies (e.g., a chemical shell) that have no other purpose than for chemical warfare. They are therefore banned under all circumstances. The article also identifies the circumstances under which toxic chemicals and their precursors are not considered CW. (Article II)

The GPC is reiterated in Article VI, which stipulates *inter alia* that toxic chemicals and their precursors can only be transferred for non-prohibited activities. Since its implementation, the CWC has focused on the results of past activities—verifying aspects of past CW programmes, remaining CW stockpiles and CW-relevant installations, and certain private and government facilities. The reporting and verification requirements for the chemical industry are largely based on the three schedules of toxic chemicals contained in the CWC.[7] This practice has tended to narrow the applicability of the convention to the listed chemicals only, in spite of the comprehensive nature of the GPC. A similar trend is noticeable with regard to the reporting of transfers of toxic chemicals under Article VI. While, in principle, the GPC applies to all transfers of toxic chemicals, the reporting requirements and application of specific export control measures pertain only to the chemicals listed in the three schedules.[8] In addition, some States Parties have sought to restrict the applicability of the CWC to scheduled chemicals only, thereby effectively disregarding the GPC.

A reduction in the scope of the general purpose criterion—whether by default, through practice or by political design—could irrevocably undermine

the CWC's ability to cope with future technological developments. At present, some production routes for particular chemical warfare agents are not covered by the schedules. Some States Parties have elected not to declare salts of scheduled CW agents. There are reports of novel chemical warfare agents that were developed to a point just before weaponization. Because of the secrecy of these programmes, the chemicals were not considered during the negotiation of the CWC, and consequently, they are not reflected in any of the three schedules. (The composition of some of these chemicals has only recently been declassified.) Other chemical compounds are being investigated for their use as so-called non-lethal weapons. Under the current reporting obligations States Parties need not inform the OPCW of such agents (and consequently there are no inspections). Incomplete or uneven implementation of the GPC with respect to such agents could effectively limit the options of a challenge inspection or investigation of alleged use. In addition rapid scientific and technological developments in chemistry and the chemical industry contribute to the high-speed screening of new toxic compounds, some of which might hold considerable attraction for warfare purposes. (see below) Present and future toxic chemicals are covered by the GPC, which, in the case of research and development, can also serve as the foundation of an ethical code against chemical warfare for scientists and other professionals.

Since the conclusion of the negotiation of the CWC the terrorist threat of the use of chemical agents has become a reality. Although terrorists may resort to traditional chemical warfare agents, there are many toxic compounds—industrial, agricultural, or other—widely available which could serve their purposes. A failure to effectively implement the GPC would deprive States Parties of an important tool within their national legislation criminalizing the preparation, possession, use or intent to use toxic chemicals for terrorist or criminal purposes. This tool ought to be included in the national implementation legislation of each State Party as the lack of such legislation in one or more States Parties could create safe havens where activities violating the CWC might be undertaken. This underscores the importance of having effective national implementation in place in all States Parties.

International cooperation and technology transfers

Article XI affirms the right of States Parties to economic and technological development, and access to technologies for purposes not prohibited under the treaty. These have proved to be the most important incentives for some developing countries that do not possess CW or face a threat from CW to join the convention and, in some cases, it has assisted in overcoming a reluctance to join. In this sense, the article has been important in promoting universality.

However, the article is also controversial politically. Some developing countries consider it as a development assistance obligation for the industrialized countries. Meanwhile many industrialized countries have come to view CW proliferation as a major threat to their security interests. They have responded with export controls in an effort to prevent the diffusion of technology that could contribute to the acquisition of CW and started to coordinate them within the framework of an informal arrangement known as the Australia Group. Many developing countries now see the Australia Group as a suppliers cartel that denies them the right to economic and technological development promised by the CWC. As a consequence, implementation of Article XI has become politicized and the issue has unnecessarily complicated policy development and practical decision-making in other areas.

Article XI is critical to the long-term implementation of the CWC and the maintenance of qualitative universality. To a lesser extent, but no less important, the demonstration of tangible benefits for States Parties under the article may still convince countries outside the treaty regime to join the convention. At present, only a small amount of the OPCW budget is allocated for Article XI initiatives. It is nevertheless clear that its relative importance will grow as the destruction of CW nears completion, freeing up resources for international cooperation.

Although the 2003 Review Conference need not resolve these questions, it can provide important guidance as to the direction such a resolution might take. In particular, the questions of which tasks should be executed by the OPCW and in which areas the OPCW should operate as a facilitator

between States Parties or between scientific institutions and industrial organizations of different States Parties should be addressed.

The basis for a solution lies with the acceptance by all States Parties of the basic obligation in Article 1—never under any circumstances to assist with the acquisition of CW. This non-proliferation obligation extends much further than the scheduled chemicals or all toxic chemicals and their precursors as formulated by the GPC. It covers all types of equipment, information, knowledge, and expertise that might contribute to a CW armament programme. As a consequence, obligations and responsibilities related to technology transfers rest equally with the exporting and the importing states.

Export controls have received most of the attention in this debate. Import controls (and controls on technology transfers between two economic units in one country), in contrast, have remained underdeveloped both conceptually and in practice. While there is a clear need to harmonize relevant export controls within the CWC framework—and to a certain extent this is already happening among States Parties through the coordination of customs regulations in regional settings—States Parties should also study ways to increase the transparency of the movement of relevant technologies inside the country following their importation. Such mechanisms can actively contribute to building confidence that the imported technologies are applied only for permitted purposes. In the short term, they may provide an answer to the question of why the verification regime of the CWC is still unable to provide sufficient guarantees of compliance to the participants in the Australia Group.[9] Conceivably, they could also help to conceptualize a long-term verification and monitoring regime that is more tailored to preventing the illegal acquisition of future technological capabilities for purposes prohibited under the CWC than to the elimination of past CW programmes. Such measures can be developed by the OPCW as a whole as a way to implement the GPC as well as by States Parties as part of their individual responsibilities to the CWC.

A second approach to resolving the political controversy would involve the formulation of specific expectations under Article XI based on States Parties individual needs instead of broad arguments. This would open up opportunities for bilateral activities between States Parties. The Technical Secretariat could act as facilitator between National Authorities or scientists and industry representatives. Such a role for the Technical Secretariat would have significant benefits for the preservation of the long-term interests of all States Parties in the CWC. At present the Technical Secretariat is developing and promoting modest, but well received initiatives (e.g., capacity-building initiatives such as the Associate Programme and information exchanges). Such initiatives should be expanded in the short term as they help developing countries to articulate their specific needs and allow mutually beneficial cooperation between the developed and developing world in a less polarized environment.

Transfers of scheduled chemicals

The transfer of chemicals listed in the three schedules is regulated under the CWC. The overriding criterion is that none of the transactions may contravene the basic purpose of the CWC. Export and import requirements vary depending on the schedule and on whether the transaction takes place between States Parties or whether a non-State Party is involved. Schedule 1 chemicals can only be transferred between any two States Parties for the purposes of research, medicine, pharmaceuticals or protection and in quantities defined by Part VI, paragraph 2 of the Verification Annex. These chemicals cannot be re-transferred to a third state. The States Parties involved must notify the Technical Secretariat not less than 30 days before any such transfer. (In 1998 the advance notification was waived for the transfer of saxitoxin for medical and diagnostic purposes in quantities of less than 5 milligrams, Verification Annex, Part VI, para. 5bis.) Moreover, all States Parties have to submit detailed annual reports regarding the transfer of Schedule 1 chemicals to the Technical Secretariat. Since the third anniversary of the CWC in 2000, States Parties may only transfer Schedule 2 chemicals among themselves. (Verification Annex, Part VII) These transactions, however, are not subjected to stringent quantitative conditions or reporting requirements similar to those for Schedule 1 chemicals. The transfer of Schedule 3 chemicals is only discussed in relation to non-States Parties. Although there are no quantitative limits, the exporting State Party must ensure that they will not be used for purposes prohibited by the convention. They will also require an end-use certificate.

Five years from the entry into force of the CWC (in 2002) the CSP must consider the need to establish other measures regarding the transfer of Schedule 3 chemicals to non-States Parties. End Use is the object of routine reporting by the National Authority of a State Party or, if the need arises, of OPCW verification inspections.

One of the original purposes of the mechanism was to encourage states to join the CWC. In practice, the monitoring system does not function as effectively as it should because, in contrast to the other components of the verification regime, it is underdeveloped. States Parties must report aggregate national data on the import and export of Schedule 2 and 3 chemicals. (Schedule 1 chemicals have a separate notification and reporting mechanism. The annual aggregate volume of all Schedule 1 transactions is around 170–180 grams, compared to the multiple tonnes range for the other two schedules.) The mechanism suffers from the lack of accurate and consistent reporting by States Parties. Several factors explain the difficulties in matching export and import data. First, many States Parties declare no transactions whatsoever, provide the TS with incomplete data sets or leave long gaps—in some cases 12 to 18 months—between the date of the transfer and the submission of data. Second, the reporting system is hampered by standard practices in the international trade in chemicals. Shipments are frequently diverted to new destinations in open sea or are transhipped in free ports so that verification of the final destination by one exporting country is extremely complicated, if not impossible. Third, the quality of national implementation legislation differs significantly between any two States Parties (see below), leading to different reporting obligations and levels of precision in reporting by the chemical industry to the National Authorities. Fourth, within the OPCW there is no common understanding about what should be reported.

Taking the overall goals of the CWC into consideration, the mechanism has two other major shortcomings. First, the export and import control requirements and the reporting obligations are only based on chemicals listed in the schedules. For instance, some mustard and nerve agent precursors are not listed in the schedules and therefore remain unreported (unless a State Party has elected to adopt more stringent national reporting requirements based on the GPC). Despite the fact that Article VI of the CWC opens with an explicit reference to the GPC, the current reporting system does not have an effective mechanism to make the GPC operational. Second, States Parties have no specific monitoring or reporting obligations with regard to other technologies (equipment, information, expertise, and so on) used in the development and manufacture of CW. This is a major deficiency in the non-proliferation regime that the CWC seeks to put in place.

Despite the shortcomings (or perhaps because of them) the obligations with respect to the transfers of scheduled chemicals have produced unanticipated, but nevertheless significant, results which may prove to be valuable for the long-term implementation of the CWC. As a consequence of the discrepancies in the export/import data, States Parties have begun to interact with each other through their respective National Authorities and in so doing have begun to interpret their obligations and gain a greater common understanding of what should be done. Furthermore, the reporting system provides the TS with qualitative information as the movement of materials leads to insights regarding the Schedule 2 and 3 production capabilities of a particular State Party. While the value of individual declarations remains relatively low for the present, the value of the reporting system as a whole increases with the passage of time as transfer patterns emerge. The detection of unexpected chemical transfers can be revealing (e.g., with respect to the possibility of undeclared chemical plants or production volumes) and the data feeds into mechanisms for industry verification. In this area, too, the development of concrete tools to make the GPC operational would increase these benefits considerably.

With the emergence of new security actors with a potential interest in toxic chemicals, such as terrorists and criminals, the question arises whether States Parties should consider mechanisms for tracking domestic transfers of chemicals. These mechanisms could be inserted into national implementation legislation. The Technical Secretariat might develop a sample formulation in the national implementation assistance packages in order to achieve common standards so that terrorists or criminals cannot exploit legislative weaknesses in any one State Party.

Emergency assistance

As a result of Article X, the OPCW has a specific mandate to provide assistance in the case of CW use or the threat of such use. However, after five years, implementation of the article and preparations for the actual deployment of assistance are still underdeveloped. Should the OPCW receive a request for assistance today, it would be unable to honour its obligations. Such an eventuality could strike a fatal blow at the CWC, as it would signify the inability of the OPCW to offset the security consequences of the voluntary renunciation of a weapon category by a State Party.

In the light of the potentially critical importance of Article X, the undertaking to implement its different aspects is underfunded within the OPCW budget. Unfortunately, the project suffers from the standard problems associated with the prioritization and allocation of scarce resources to protect against threats. The wisdom of the investment can only be demonstrated if the threat actually materializes. In the meantime, the expenditure produces no visible return on investment. In the wake of the terrorist attacks of 11 September 2001 the OPCW received an increased number of requests for help and advice. The organization was unable to meet them for lack of resources. This has led to several complaints, which were discussed in the Executive Council. The current financial difficulties of the OPCW make immediate budget increases in this area problematic.

The problems related to the organization of emergency assistance have been exacerbated by new threat perceptions with regard to CW proliferation and terrorism. The 11 September 2001 attacks appear to have provoked a tendency in some countries to place national security above collective security. In parallel to these developments the view has gained currency that sharing information about national CW defence programmes (as mandated by the CWC) or providing the OPCW with equipment to detect chemical warfare agents or protect against them (as one of the means open to a State Party to meet its obligations under Article X), will reveal the weaknesses in CW defence postures and consequently enable potentially hostile countries to exploit them.

Despite the considerable changes to circumstances and threat perceptions that may be required to achieve a meaningful implementation of Article X, the OPCW cannot afford to fail. This would seriously damage the prospects of universality in terms of attracting new ratifications or accessions from states in regions of conflict and of maintaining the long-term interest of States Parties to be actively engaged in the CWC regime. Should some States Parties decide that their security interests were better served through unilateral measures, such as CW armament for deterrence purposes, the whole prohibitory regime on chemical warfare would collapse.

3. National implementation

The comprehensive nature of the CWC is reflected in its application at the international, state and domestic levels. At the international level, the OPCW oversees the implementation of the convention. At the state level, the government enacts implementation legislation and chemical export controls, prepares and submits declarations and annual reports, hosts inspections and eliminates any CW stockpiles or CW production facilities. It also establishes a National Authority to serve as the national focal point for effective liaison with the TS and with other States Parties. At the domestic level, the chemical industry, in particular, is subject to declaration and inspection requirements. Coordinated, comprehensive and effective national implementation of the convention is vital in order to establish and maintain the credibility of the verification regime. While the TS can provide assistance it is the State Party which is ultimately responsible for developing and implementing its own national legislation to achieve this goal.

Article VII: implications and challenges

Article VII of the CWC requires the States Parties to adopt the national measures necessary to implement the provisions of the convention, including the establishment of a National Authority. It can choose to set up a new body or designate an existing body. One of the principal tasks of the National Authority is communication with the OPCW and other States Parties. Its responsibilities generally also include analysing the domestic chemical industry, both private and state; providing initial and annual declarations; escorting OPCW inspectors; negotiating and concluding Facility Agreements; overseeing the closure of former CW

facilities and destruction activities; coordinating the provision of national assistance; monitoring the level of chemical export and import activities; reviewing national regulation of international trade and industry; and overseeing the destruction of old or abandoned chemical weapons. A second important aim of national implementation is to prevent individuals or legal entities under a state's jurisdiction or control from undertaking prohibited activities and to criminalize all prohibited activity by its nationals anywhere in the world. Each State Party is also obliged to cooperate with other States Parties and to provide legal assistance to facilitate the implementation of the treaty's obligations.

Each State Party has an obligation to notify the OPCW that it has set up an NA (Article VII, para. 4), which should be in place by the time that the CWC enters into force for the State Party. As of 28 September 2002, 110 notifications have been received. The remaining states have not established an NA. This is a major shortcoming for the effective implementation of the CWC. The NA is the starting point for active participation in the CWC regime. Article VII gives little guidance on how the NA should be structured. Better-developed OPCW guidelines on this issue would facilitate a faster and a more effective process of implementation.

The absence of an NA is a major reason for non-implementation, poor implementation and not undertaking control activities regarding the transfer of scheduled chemicals. Consequences of the lack of or a badly functioning NA are apparent in the quality of the declarations sent to the OPCW. An efficient NA and effective implementation complement one another. With effective implementation legislation in place, the NA is equipped with the legal powers and practical resources it needs to function. In addition, it can facilitate further or improve existing legislation based on experience. Finally, a well-functioning NA provides the TS with all relevant information in a timely fashion, thereby contributing to the general confidence that the State Party is in compliance with the CWC.

Assistance with legislation

To facilitate national implementation, the OPCW has created the Implementation Support Branch which organizes workshops, training courses and other activities to meet the challenges of national implementation. It has produced NA information packages. The OPCW has also produced Model National Implementing Legislation drawing largely on existing legislation by States Parties. The model outlines the major areas that should, in most cases, be integrated into national legislation. It makes the process of implementation more understandable to States Parties and aims to facilitate the harmonization of legislative frameworks, thereby increasing their overall effectiveness. The model implementation legislation includes general provisions on executive powers, the legal precedence of CWC obligations over other regulations, the establishment of an NA and a permanent mission to the OPCW, suggestions for national criminal provisions with reference to individuals and legal entities, the confidentiality provisions of the CWC and entry into force.

National implementation legislation

As of 28 September 2002, less than half (70) of the States Parties have notified the TS of their implementation legislation. The quality of the legislation also varies greatly, and in some cases the legislation is incomplete. In particular, some States Parties have not given their legislation extraterritorial effect, as required under Article VII, or have incomplete regulations on the transfer of treaty-controlled chemicals.

The explanations given for the lack of or incomplete legislation relate to the lengthy process of preparing and enacting legislation, competing domestic legal and policy priorities, and coordination and information-gathering difficulties.

Developing countries, non-possessor states and universality

Three-quarters of the parties to the CWC are developing countries. While they contribute important perspectives and to the goal of universality, most do not possess CW or face a threat from CW. Furthermore, many do not have a significant chemical industry. Ratification provides political status and security, access to technological developments, economic gains and assistance from the OPCW if requested.

For a large group of developing countries that do not possess CW, face a CW threat or only have a small chemical industry, the full implementation of the CWC may not be the highest domestic policy priority. The resulting lack of full administrative and legal tools to interact with the OPCW generates its

own difficulties with regard to universal compliance with the CWC. In many developing countries, knowledge of the requirements is incomplete, the competition for resources fierce and the ability to allocate resources to meet the obligations of the CWC often does not exist. The relevance of expanding the CWC to states without the incentives or the capabilities to fulfil their obligations becomes more problematic in this light. For national implementation to be effective, there needs to be a collective and mutual interest in disarmament and confidence building.

A regional workshop held by the Southern African Development Community in November 2000 identified several problems which developing countries may encounter when joining the CWC. They relate to the understanding of the convention's requirements, the establishment of an NA, the development of the simplest, most effective and least costly approach to national legislation, the preparation of national declarations, making declarations with respect to disputed territories and a variety of issues ranging from communication with other States Parties regarding the transfer of scheduled chemicals to the insurance of shipments. These issues highlight the need to assist States Parties in the developing world with the many practical problems of implementation and to find ways of engaging them more actively in the overall process of building the CWC regime.

The TS has an implementation support programme which assists NAs to prepare declarations. However, more support is needed both in the preparatory stage, before a state joins the CWC, and after its having become a party. In other words, there should be a certain degree of institutional preparedness before the achievement of State Party status in order to speed up the national implementation process and guarantee more active participation by the new State Party. Monitoring and evaluating implementation progress using specific targets and milestones would also benefit the implementation legislation. Even in cases where implementation legislation is comprehensive and well drafted, there is still a need for follow-up support from the TS. The individual quality of national implementation has an effect on the overall quality of international implementation.

A two-tier system whereby one set of States Parties generally meets all their obligations and a second set of States Parties has either ineffective or no implementation mechanisms and procedures causes tension among the members of the OPCW. This is not beneficial to confidence in the CWC regime as a whole. Only through States Parties meeting the obligations of national implementation can the development of universal international law be achieved. States Parties with little or no engagement in the CWC contribute poorly to the quality of universality. Measures need to be developed within the convention in order to create pressures and demands for more active involvement from all participants in the treaty.

4. Technological developments

The OPCW has justifiably been concerned mainly with past CW programmes and has devoted a considerable amount of its resources to making inventories and verifying the destruction of CW stockpiles, production facilities and related installations. Nonetheless, it also has the important task of preventing future weapon programmes involving exploitation of the toxic properties of chemicals. Future armament programmes may be based on so-called traditional toxic compounds and their precursors, most of which are listed in the three schedules of the CWC. However, future armament programmes could also be based on toxic chemicals which—while captured by the General Purpose Criterion, but not listed in the schedules—may fall outside of standard reporting and inspection routines. These toxic chemicals may be new or existing. As well as product innovation there is also process innovation, whereby traditional or novel chemical warfare agents and their precursors may be produced in ways which current inspection procedures were not designed to detect.

There is a revolution in science and technology as it affects chemistry and biology. There are new ways of synthesizing toxic chemicals and this presents a significant challenge to the CWC. The industries of most concern are the pharmaceutical, animal health and plant agriculture industries. These are a part of biotechnology. The scientific fields of interest are computational chemistry, combinatorial chemistry and chemical biology. Microarray processing technology may also adversely affect the CWC if the OPCW does not take changes in this field into account.

Reviews of the operation of the CWC have to take into account 'any relevant scientific and tech-

nological developments' as part of the review process. This review process is of critical importance because the revolution in science and technology as it affects chemistry and biology may adversely affect the future relevance of the CWC if the OPCW neglects to take these developments into consideration.

Pace of technological development

There has been enormous progress in computational chemistry in the past decade. Theoretical methods such as quantum mechanics, molecular dynamics and statistical mechanics have been used to categorize chemical systems and have contributed to the synthesis of materials, drugs and other chemicals.

Combinatorial chemistry is an important new methodology used largely in the pharmaceutical, agrochemical and biotechnology industries to reduce the time taken to produce and screen molecules that may be effective as new drugs. Combinatorial chemistry allows the creation of a population of drugs that can be screened almost instantaneously and so increases the possibility of finding new molecules of significant commercial and therapeutic value. It is a convergence of chemistry and biology, that is, a complex interplay of organic synthesis, drug-design strategies, information management and robotics. The new field of chemical biology is a mixture of fundamental advances in chemistry, biochemistry and molecular biology and this gives an opportunity to probe living systems at the molecular level.

In the screening of potential drugs for biological activity much attention is given to toxicity. While such toxic compounds are of little interest to the pharmaceutical industry, any of them may be of interest as a potential chemical warfare agent. The new science of toxicogenomics uses the proteomic and microarray techniques to vastly speed up toxicity testing.[10] This would allow toxins to be screened out at an early stage of drug testing but is also an advance-warning system for the development of a new chemical agent.

In addition, new commercial processes for producing chemicals will make verification much more difficult because the scale of production will be smaller and the 'footprint' of production more difficult to see. In order to make these production processes visible under the CWC, the reporting thresholds would have to be lowered.

European strategy

There were 100 106 existing commercial substances in 1981. Of those, about 30 000 were sold in volumes greater than 1 tonne. The number of 'new' substances reported since 1981 is about 2700. There is a lack of knowledge about the impact of many chemicals on human health and the environment. In general there is a lack of knowledge about the properties and uses of existing compounds and risk assessment procedures are slow. This is a cause for alarm in the general population. Hence, in 1999 the European Commission adopted the European Commission Strategy for a Future Chemicals Policy, which is of considerable importance to the CWC.[11] The commission proposed that, by 2012, all new and existing substances be evaluated by REACH (Registration, Evaluation and Authorization of Chemicals). Some 140 substances have been categorized as 'priority substances' for comprehensive risk assessment.

All new substances will be tested and assessed according to the amounts placed on the market; for example, 10 kg will trigger testing with progressively more testing required at 100 kg, 1 tonne, 10 tonnes, 100 tonnes and 1000 tonnes, respectively. However, there will be exemptions for research and development quantities of these substances for up to 5 years. All chemicals produced in quantities of over 1 tonne will be registered, and at higher tonnages special attention will be given to long-term and chronic effects. Priority will be given to substances that involve higher exposure and have known dangerous properties.

Generally, the industry will be responsible for all testing and there will be a tiered approach to registration time limits: 1000 tonnes by 2005, 100 tonnes by 2008 and 1 tonne by 2012. Tests already carried out in the United States and Canada will be admissible in order to speed up the process. All stakeholders, for example, customers and employees, will have access to non-confidential information in the database through safety data sheets, and so on. All commercial substances are to be tested by 2012.

With all industrial chemicals being tested under this strategy, the OPCW Approved Analytical Database could be strengthened by registering those toxic compounds that are threat agents, that are related to scheduled chemicals and that cause analytical equipment to confuse them with

registered chemicals. Those products of the biotechnology industry that are of interest to the CWC could be considered as discrete organic chemicals which may contain the elements phosphorus, sulphur or fluorine (DOCs/PSFs) and be covered by Part IX of the Verification Annex 'Regime for other Chemical Production Facilities'. Over the next five years, DOCs/PSFs will become much more important to verification tasks.

Toxins will require more scrutiny, especially if the international community fails to achieve a legally binding instrument to strengthen the 1972 Biological and Toxin Weapons Convention (BTWC).

Role of the Scientific Advisory Board and implications for the GPC

The work of the OPCW Scientific Advisory Board (SAB), established under Article VIII of the CWC, (para.21 (h)) should be extended to examine the military use of toxicogenomics and biotechnological pathways to DOC/PSFs. In general, the SAB should be used for substantive study. This should not just be seen as a way of dealing with awkward problems. It should have a major role in the review process.

The use of the GPC must be stressed in both the CWC and the BTWC. The continuing inability to develop a legally binding instrument for the BTWC makes it important to look carefully at the 'grey areas' between the CWC and the BTWC, for example, toxins and peptides, and to have their status reviewed by the SAB with a view to bringing them into the verification regime where their production and consumption merits it. The TS should familiarize itself with the new EU Chemicals Policy.

5. The verification regime

Verification is the process of confirming that States Parties are in compliance with the agreement. It is essentially accomplished through the identification, declaration and inspection of relevant activities and locations. It results in states having confidence that other members are complying with an agreement. In the case of the CWC, the purpose of verification is to confirm that no party acquires or retains CW. Developing a verification regime has presented many practical and conceptual challenges during both the treaty negotiation and its implementation. Two major challenges have been to devise an effective and practical definition of CW, and to provide for systematic monitoring and verification of military facilities and a selected part of the chemical industry in such a way that confidence that prohibited activities will be detected can be maintained.

The CWC verification process essentially consists of the collection and analysis of national declarations, on-site inspections, preparation of final inspection reports and possible follow-on action by the Director-General, the EC or the CSP in order to clarify any unresolved ambiguities. A process of informal consultation, cooperation and fact-finding may also occur between two or more parties and may involve the participation of the TS (Article IX). Serious unresolved questions may result in the launching of a challenge inspection (Article IX, Part X, Verification Annex). The CWC also restricts and monitors the transfer of scheduled chemicals (Article VI).

The verification process is subject to modification at the operational level. Factors contributing to this modification are generally related to assessments of the convention's protection of sensitive military and industrial information, perceived effectiveness and financial cost.

There are four main types of inspection-based verification activity envisaged under the CWC: verification of the chemical industry, verification of CW-related facilities, investigations of alleged use and challenge inspections. The first two activities are carried out systematically, while the latter two are carried out on an ad hoc basis. There have been no challenge inspections or investigations of alleged use thus far, as no State Party has requested any.

Since the CWC's entry into force, CW stockpiles of around 70 000 agent tonnes and 8.6 million munitions have been declared by India, South Korea, Russia and the United States. As of 28 September 2002, approximately 6700 agent tonnes and approximately 2 million munitions have been destroyed. As of the same date, 28 of 61 declared CW production facilities have been certified as destroyed by the OPCW.

Verification of CW-related facilities involves confirmation of the non-diversion of CW, confirmation of declared information regarding CW and related facilities, and confirmation of the destruction of all types of CW (CWC, Articles IV and V). Activities related to defence and protection against chemical warfare must also be declared and are subject to

systematic verification. Verification is based on information provided in States Parties' initial declarations and declarations submitted annually thereafter. Verification of defence-related activities using non-scheduled chemicals may be captured in the CWC's verification regime either by amending the schedules or through the implementation of the GPC, which may also be implemented at the discretion of a State Party that chooses to declare an activity in its defence establishment involving non-scheduled chemicals. The criterion may also be implemented through the consultations, cooperation and fact-finding provisions of Article IX, including the launching of a challenge inspection.

Verification of the chemical industry is determined by whether a facility or plant site produces, processes or consumes chemicals appearing in the schedules or produces certain unscheduled DOC/PSFs. The CWC defines a DOC as 'any chemical belonging to the class of chemical compounds of carbon except for its oxides, sulphides and metal carbonates' (Verification Annex, Part 1, para. 4). The category of DOC/PSFs was established partly because of the chemicals themselves and partly in order to capture the plant sites which may be highly modern and easily convertible which allows them to produce a wide variety of specialized chemicals, to order, in small batches. A facility or plant site may be subject to systematic verification one year and, because of changes in the types and quantities of chemicals involved, not be subject to such verification in subsequent years. Although there is some degree of flexibility in terms of the allocation of inspection resources and the level of verification applied to Schedule 1 facilities and Schedule 2, 3 and DOC/PSF plant sites, there is a general pattern in the level of verification, with Schedule 1 facilities receiving the highest level and DOC/PSFs the lowest. The level of verification varies partly because the Schedule 1 facilities and Schedule 2 plant sites are assessed individually in terms of the risk they pose to the CWC, including the quantity of the chemical involved, while Schedule 3 and DOC/PSF plant sites are not individually differentiated according to 'risk'. The chemical industry is also subject to the GPC. In practice, systematic verification of the chemical industry is heavily based on the types and quantities of scheduled chemicals produced, consumed or transferred. Some States Parties have put internal review mechanisms in place to consider chemical industry trends which are also discussed within the OPCW, including the SAB and elsewhere at the margins. Finally, States Parties may choose to place specific chemicals or activities under systematic verification by modifying verification procedures (e.g., modifying frequency-of-inspection algorithms) or by amending the schedules.

No formal statements have been made within the framework of the OPCW to the effect that any party is pursuing a clandestine CW programme or has used CW. As a result, no investigation of alleged use or challenge inspection has been carried out. Nonetheless, the OPCW continues to prepare for such inspections, partly through periodic practice exercises. There is a continuing need for the OPCW to carry out periodic practice challenge inspections and practice investigations of alleged use. Prior practice challenge inspections have highlighted a variety of practical problems, many related to logistics. They have also proved useful in allowing inspectors to familiarize themselves with the proper implementation of sampling and testing protocols, in 'real time', that can provide reliable and reproducible technical findings which, in turn, can serve as the basis for appropriate action at the higher, political level.

Verification issues

Some of the principal issues affecting verification include the degree to which CWC provisions are interpreted narrowly—according to the 'letter' rather than the 'spirit' of the convention, how the principle of equal treatment among all States Parties is understood and implemented at the operational level, and how to define 'risk' to the convention and implement effective policies and mechanisms to mitigate such risks. Verification is not the only activity carried out under the CWC and, as States Parties wish to maintain and enhance the organization's cost effectiveness, all OPCW activities must take into consideration the level of funding available. Verification-related issues also demonstrate the extent to which technical issues are or can be separated from political considerations.

For implementation purposes, verification activities are often seen as 'concepts' which are tailored to the specific type of facility or plant site being declared or inspected.[12] Such concepts are developed in order to match the relatively general convention provisions with the specific require-

ments of carrying out verification activities at the various types of facility (e.g., chemical weapon destruction facilities and chemical weapon storage facilities), as well as the individual facilities themselves. They reflect States Parties' views of how the CWC's verification provisions should be implemented, both conceptually and more specifically, given various political, technical, financial and human constraints. They also assist the TS's understanding of how to implement CWC provisions. At the planning level, verification concepts are reflected in the development of risk and frequency-of-inspection algorithms and discussions of the proper distribution of inspection resources among the various types of declared facilities and plant sites. At the operational level, verification concepts are reflected in facility agreements concluded for the various types of CW-related facilities, Schedule 1 facilities and Schedule 2 plant sites. Such agreements, which are signed by the Director-General and a State Party representative, contain the facility's name and address, provisions related to the use of approved inspection equipment, health and safety procedures, and specific arrangements to protect sensitive information.

While the narrow interpretation approach has had the effect of limiting financial costs and has helped to delineate the convention's scope, this emphasis could make it more difficult for the CWC regime to respond to specific concerns about compliance and the optimal use of inspection resources, including those directed towards DOC/PSFs. There must be a reasoned and balanced approach to systematic verification which takes into proper consideration current and future technological capabilities and changes.

Budgetary issues and implications

The main issue affecting verification of CW-related facilities has been the level of available funding. The problem consists of two parts. One, essentially procedural, involves the assessment and disbursement of the 'direct costs of inspection' for CW-related facilities (Articles IV and V). The inspected State Party must pay for the costs directly associated with a given inspection carried out under both articles including, most significantly, the salaries of inspectors during the period in which they carry out their tasks inside the inspected State Party. The OPCW has experienced financial shortfalls. The current shortfall (2002 budget) is approximately €2 million. This has largely been caused by delays in reimbursements for Article IV and V inspections and overly optimistic estimates, during the annual budget planning process, of the total amount of such incurred costs. The reasons for the latter include a trend towards reducing the size of inspection teams, reductions in the number of some types of inspections, reductions in the length of inspections and the fact that optimistic income estimates free up funds, at least on paper, for other CWC-mandated activities. The issue is complicated by the fact that the OPCW operates on an annual budget and is not allowed to run a deficit or borrow money. Money that is unspent at the end of the year must be credited to member states' contributions for the following year. Finally, the OPCW budget and government budgets in some countries operate on calendar years, while others operate on fiscal years. This has, in some cases, led to procedural delays of several months in reimbursing the OPCW.

A two- or three-year planning and budget cycle, including the ability to carry over sufficient funds for the planning and carrying out of inspections, and allowing for routine delays in inspection reimbursements, would result in greater predictability in the allocation and spending of OPCW resources on its various activities.

The second major element of the financial difficulties relates to the fact that the proportion of inspector days spent at chemical weapon destruction facilities (some 70 per cent of all inspector days since entry into force of the CWC have been spent at such facilities) is increasing and, unless changes in verification procedures or concepts are implemented, will continue to do so for at least the next two or three years. Another three (or possibly four) destruction facilities will be brought online in the near future, with more to follow. The OPCW will not have the human and financial resources to implement current verification procedures at such facilities. The current verification regime for CW-related facilities is heavily dependent on an on-site presence. This is largely a result of the way in which inspection and verification procedures were elaborated by the Preparatory Commission prior to the treaty's entry into force. Relatively little has been done to reduce this dependence, and the associated costs by, for example, introducing automatic or remote monitoring. Such measures

could enhance the inspection team's verification effectiveness to the point where the size of the team could be further reduced. Neither does the OPCW conduct remote monitoring through satellite uplinks from its headquarters in The Hague, even though discussions to this effect, largely motivated by a desire to reduce costs, have taken place periodically over the years. In addition, some of these facilities will employ neutralization-based destruction technologies, which will complicate established OPCW inspection procedures, designed to track CW from their storage facilities until their 'end point of destruction'. Such measures have, thus far, been oriented towards incineration-based destruction technologies. In the case of neutralization-based technologies, however, the OPCW may have to monitor the transfer of large volumes of hydrolysates (typically some five to six times the volume of the original CW agent) off site to verify their final destruction or use for non-prohibited purposes. This is largely because of the CWC requirement that CW destruction be 'essentially irreversible'. A single-stage hydrolysis of CW agents does not constitute destruction (Verification Annex Part IV(A), para. 12). However, the extent and nature of the monitoring and verification of non-incineration-based destruction technologies have still not been decided.

Inspection costs could also be reduced by reclassifying some inspector positions from the professional to the general services level. It would be important to have proper planning and sufficient time in order to ensure that the reclassification process was not destructive to the OPCW. (This could be done partly by ensuring those employees who currently hold professional level positions that they will not have their jobs reclassified and that their job security will not be adversely affected as a result of a job classification programme. By ensuring that the team was headed by a professional-level inspector, any potentially adverse effects in terms of the inspection team's status and its effect on the relationship between the inspection and host teams could be minimized.) States Parties should consider a two-tiered tenure policy similar to that of the International Atomic Energy Authority whereby inspectors and other TS employees with specialized skills and knowledge would be exempted from the 7-year tenure rule. A tenure of longer duration could be decided on for such employees.

Chemical industry-related issues

The main purpose of chemical industry inspections is to confirm the consistency of States Parties' declarations. Inspection teams are not interested in, and indeed have no need for, most of the information that could be useful to the inspected facility's business competitors. The type of information being sought is largely based on material accountancy methodology to confirm the production, processing or consumption levels of declared chemicals. To achieve this, the inspected facility or plant site records should show opening inventories, closing inventories and an account of intermediate activities (i.e., the amounts of chemicals processed, transferred or produced). Any deviations, such as those caused by incomplete draining of holding tanks, can then be addressed. In principle, this can be achieved without having to divulge confidential business information such as the composition of catalysts and specific operating parameters of production processes.

As with CW-related facilities, many of the outstanding implementation issues concerning the chemical industry relate to the scope of application of treaty provisions, both in terms of individual facilities or plant sites and in terms of how much of the chemical industry should be captured under systematic monitoring and inspection. Problems occur regarding individual facilities and plant sites largely as a consequence of the quantitative declaration thresholds selected for Schedule 2, and Schedule 3 chemicals appearing in mixtures at 'low concentration'.[13] Chemical industry inspections have also, on occasion, been restricted through a narrow definition of Schedule 2 , 3 and DOC/PSF 'plant sites' and through a restrictive interpretation of such plants' 'boundaries of production' (i.e., where production begins and ends). How these issues are dealt with at the operational level reflects States Parties' views on the scope, frequency and intrusiveness of inspections necessary for the CWC to remain credible.

Inspection procedures for facilities producing minute quantities of Schedule 1 chemicals could be modified to allow for a full inspection in cases where changes have been made to equipment or operation.[14] It is sometimes suggested that a threshold for 'legal zero' could be established for Schedule 1 chemicals below which declarations

and inspections would not be required. There is no minimum declaration threshold for Schedule 1 chemicals. Thus, milligram quantities of Schedule 1 chemicals are declared and subject to inspection, at least annually. Most Schedule 1 facilities are laboratories using gram-level quantities of Schedule 1 chemicals. Although minute quantities of Schedule 1 chemicals may pose a lesser risk to the objectives and purpose of the CWC than hundreds of tonnes of Schedule 2 chemicals, the former are generally subject to a higher level of verification.[15] However, the extent to which a legal zero threshold might be useful is unclear.

6. Conclusions

Five years after entry into force the CWC faces the first comprehensive evaluation of its functioning and its contribution to international peace and security. Within this short time frame the convention has established itself as a central tool for the prohibition of chemical warfare. The large number of ratifications and accessions testifies to the importance that the international community attaches to the prohibition. All declared CW possessors have commenced the destruction of their stockpiles. Installations and facilities related to former CW programmes in many other countries are being destroyed or converted for peaceful purposes under international supervision. A workable global verification regime for the chemical industry has been created and, under the impulse of the CWC, some neighbouring countries have begun to harmonize their respective controls on cross-border trade. In practice, the negotiators have laid the foundation for a security regime that has turned out to be much more cooperative than the many detailed provisions to detect non-compliance and restore compliance might have initially suggested.

Despite the obvious successes, the CWC is at a crossroads. The convention faces many challenges, ranging from fundamental changes in the international security environment to accelerating advancements in science and technology. In order to meet these challenges, the OPCW and each individual State Party will have to optimize the tools and resources offered by the CWC, initiate more effective implementation of the GPC and consider modifications to current procedures or devise new tools.

National implementation of the CWC obligations by each State Party is equally critical to the strength of the treaty. Research conducted by SIPRI before the entry into force of the CWC concluded that national implementation and the individual responsibility of States Parties to the convention would be key to the success of the disarmament regime.[16] The current review of the operation of the CWC confirms that the absence of a National Authority and weak or non-existent domestic legislation are major causes of uneven implementation of the CWC obligations, which, in turn, affects the credibility of the verification regime.

On the whole, there is little reason to suppose that the CWC cannot continue to play a useful and necessary role in the current and future international security environment. The forthcoming review conference offers an excellent opportunity to evaluate the current functioning of the convention and to consider future security challenges and changes in the chemical industry.

Recommendations

- The future relevance of the CWC to all States Parties will depend greatly on the extent to which the OPCW can reaffirm the core prohibitions in the light of technological changes and adapt the currently available instruments and procedures to emerging challenges and expectations.
- The OPCW must therefore confirm the centrality of the General Purpose Criterion (GPC) to the future of the CWC. The GPC is of critical importance with regard to the expansion of the scope of the CWC to scientific and technological innovation, the criminalization of acts by criminals and terrorists involving toxic substances, the development of codes of conduct for scientists and professionals, and the creation of an effective regime to verify the export and import of chemicals and other technologies to prevent current and future CW proliferation.
- The budgetary problems at the OPCW have a significant impact on the operation and implementation of key aspects of the CWC. As far as the problems are structural, the OPCW should adopt a multi-year budget planning cycle, permit the TS to carry over sufficient funds from one year to another, and consider revisions in the current procedures for the reimbursement of inspection costs.
- Honouring the obligations of the CWC is the primary responsibility of each State Party. Effective national implementation legislation and a functioning National Authority in each State Party are key to the strength of the CW disarmament regime as a whole.
- The emergence of terrorism using toxic chemicals underscores the importance of having effective national implementation legislation in place. Lack of such legislation creates the possibility of safe havens for terrorists and criminals to prepare for the use of toxic chemicals, which threatens the country concerned or other States Parties.
- States Parties that have not yet done so should consider the introduction of the GPC into their national implementation legislation in order the create the legal foundation for the criminalization of the preparation, possession and use of any toxic chemical for terrorist or criminal purposes.
- In the light of the importance of national implementation of the CWC, the TS should be provided with additional resources to support States Parties in meeting their obligations and to assist non-States Parties to meet the minimum implementation requirements before joining the convention. The Technical Secretariat should also be encouraged to stimulate a harmonization of national implementation legislation in order to improve the output of the monitoring and transparency-generating instruments of the CWC and to avoid or limit the weak spots in the treaty regime.
- States Parties should grant the TS the right in principle to collect information of relevance to the functioning of the CWC. In particular, information collection will be important for those aspects of the verification regime where the monitoring of patterns gains importance, as is the case with the transfer of toxic chemicals or the assessment of potential risks posed by DOC/PSF facilities to the CWC. Information collection will also be a cornerstone of making the GPC operational.
- Concrete implementation of Article XI on international cooperation is critical to the maintenance of the qualitative universality of the CWC. States Parties should explore equitable mechanisms of technology transfer that satisfy concerns about potential CW proliferation, on the one hand, and the aspirations of technological and economic development, on the other. The TS should be given sufficient resources to enable it to expand its current efforts to assist developing countries to articulate their specific needs and to facilitate interaction between scientists and industry representatives of different States Parties.
- Of particular concern is the fact that the OPCW is at present incapable of honouring its obligations to provide emergency assistance to a State Party in the case of CW use or a threat of such use. If Article X were to fail when assistance was required this could signify the collapse of the prohibitory regime on chemical warfare. It is urgent that the implementation of Article X be adequately funded. States Parties should also meet their individual obligations and responsibilities under Article X with regard to providing emergency assistance to another State Party.

Recommendations *contd*

- As a consequence of the difficulties of developing a legally binding instrument to strengthen the Biological and Toxin Weapons Convention (BTWC) the OPCW should assess the implications for the CWC of the substances covered by the GPC of both conventions (e.g., toxins and bioregulators), but not specifically listed in the schedules of the CWC. More specifically, the Final Document of the review conference should state unambiguously that the GPC of the CWC covers these substances.
- The basic aim of the CWC is to eliminate existing chemical warfare capabilities and prevent future CW armament programmes. In order to preserve the disarmament momentum, CW possessors are urged to proceed with their destruction programmes according to the CWC-mandated time frame. Delays involve cost increases that affect the OPCW as a whole, and any delays beyond the maximum time frame of 15 years after entry into force of the CWC may raise questions regarding the commitment of the State Party to its core disarmament obligations. States Parties may wish to consider further financial and technological assistance in order to achieve a timely destruction of all CW stockpiles.

Endnotes

[1] Full listings are available from the SIPRI CBW Project Internet site at URL <http:// projects.sipri.se/cbw/docs/cw-cwc-mainpage.html>. For background on the CWC see Zanders, J. P., Eckstein, S. and Hart, J., 'The Chemical Weapons Convention', SIPRI Fact Sheet, Apr. 1997, URL <http://projects.sipri.se/cbw/research/ssf-cwc-fs-eif.html>; and Perry Robinson, J. P., Stock, T. and Sutherland, R., 'The Chemical Weapons Convention: the success of chemical disarmament negotiations', *SIPRI Yearbook 1993: World Armaments and Disarmament* (Oxford University Press: Oxford, 1993), pp. 705–34, accessible at URL < http://projects.sipri.se/cbw/research/cbw-yb1993.pdf>.

[2] CWC, Verification Annex, Part IX, para. 26. As a formal obligation this undertaking is limited to the first review conference, to be held in 2003.

[3] See, for example, United States of America, Measures to ensure universality, Conference on Disarmament document CD/CW/WP.357, 8 Aug. 1991.

[4] The intention is made clear by the reference to 'The States Parties to this Convention' in the opening clause of the Preamble and the repeated explicit references to the 'States Parties' in the articles that establish the obligations and extend rights.

[5] Dinstein, Y., 'Ratification and universality', in Bardonnet, D., *The Convention on the Prohibition and Elimination of Chemical Weapons: A Breakthrough in Multilateral Disarmament* (Hague Academy of International Law and Martinus Nijhoff Publishers: Dordrecht, 1995), pp. 164–65.

[6] This should be accomplished by 2007, although the CWC allows for extension periods of up to five years. Current projections suggest that as a consequence of economic, political and technological complications Russia and the United States might exceed the maximum 15-year period for CW destruction in the CWC.

[7] The convention categorizes chemical compounds of particular concern in schedules depending on their relative importance for the production of CW agents or for legitimate civilian manufacturing processes. Apart from their significance for verification and reporting routines, the three schedules also form the basis of an export control regime among States Parties and between States Parties and non-States Parties.

[8] The regimes governing the transfer of chemicals are detailed in the Verification Annex, notably Part VI, B for Schedule 1 chemicals, Part VII, C regarding the transfer of Schedule 2 chemicals to non-State Parties, and Part VIII, C regarding the transfer of Schedule 3 chemicals to non-State Parties. The import and export of Schedule 2 and 3 chemicals to other States Parties are the subject of the initial and annual declarations to be submitted by each State Party (Part VII, A and Part VIII, A respectively).

[9] Batsanov, S., 'The CWC: issues for the First Review Conference', briefing to the Center for Nonproliferation Studies, Washington, DC, 20 Mar. 2001, URL <http://cns.miis.edu/dc/032001.htm>.

[10] Toxicogenomics uses proteomics and microarray techniques to analyse the response of cells to known toxins. The technology dramatically reduces the time and expense of testing chemicals for potential harmful effects. Each cell produces thousands of proteins and each protein has a specific function. The collection of proteins is called the cell proteome and protoemics is the study of the structure, function, location and interaction of proteins within and between cells.

[11] *White Paper: Strategy for a Future Chemicals Policy* (Commission of the European Communities: Brussels, 2001), URL <http:europa.eu.int/comm./environment/chemicals/0188_en.pdf>.

[12] See Verification Annex, Part III.

[13] Schedule 2 and 3 chemicals appearing in mixtures at 'low concentration' need not be declared and are not subject to systematic inspections. To date, consensus has not been achieved on what these thresholds should be. Most parties, however, have adopted a 10% threshold for Schedule 2 and a 30% threshold for Schedule 3 chemicals.

[14] Kenyon, I., 'The Chemical Weapons Convention and OPCW: the challenges of the 21st century', *CBW Conventions Bulletin,* no. 56 (June 2002), p. 2.

[15] Kenyon (note 13).

[16] The research papers are available from the SIPRI CBW Project Internet site at URL <http://projects.sipri.se/cbw/research/ssf-cwc-mainpage.html>.