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Chemical Weapons and Warfare

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A. Chemical Weapons

1 Chemical weapons can be distinguished from conventional weapons and from biological weapons (→ *Biological Weapons and Warfare*). Their destructive effect does not result from explosive force (as is the case with most conventional weapons) but from the toxicity of chemical agents. Toxic living organisms (eg anthrax) which are intended to cause death or severe harm to people, animals, and plants are considered biological weapons. Non-living toxic substances produced by living organisms are called toxins (eg botulinum toxin, ricin, and saxitoxin) may be considered either as chemical or as biological agents.

2 Chemical weapons may be classified either by their volatility, their envisaged military usage, or by t toxic effects. Hence, non-persistent (generally effective for hours), and persistent agents (generally effective for days or weeks); anti-personnel, anti-plant, and anti-material agents; and blistering agent sulphur mustard and phosgene oxime), blood agents (eg, hydrogen cyanide and cyanogens halides), choking agents (eg phosgene and chloropicrin), nerve agents (distinguishing tabun, soman, sarin, and other G-agents from V-agents), and psychotomimetic agents (including LSD and BZ [3-quinuclidinyl benzilate]) may be distinguished.

3 In light of the fact that the consequences of chemical weapons use can only be determined and controlled to a limited extent, and that the damage they cause is indiscriminate between → *combatants* and civilians and often disproportionately harmful to the environment (→ *Humanitarian Law, International*), they have also been labelled → *weapons of mass destruction*.

4 For the purpose of legal regulation, definitions have been developed which take into account the above descriptions; they may, however, to a certain extent, deviate from them. It is thus important to carefully analyse the definition of chemical weapons within each particular legal instrument in order to ascertain whether or not a particular agent is covered by the rules included therein. The broadest definition of chemical weapons currently applied by international law is included in Art. 2 Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction ('CWC'). This is due to the fact that the CWC aims at eliminating an entire category of weapons. Art. 2 CWC employs a so-called 'general purpose criterion', reflecting the intended use of the chemical. Accordingly, any toxic or precursor chemical is regarded as a chemical weapon unless it has been developed, produced, stockpiled, or used for purposes not prohibited under the CWC, and as long as the types and quantities are consistent with such purposes. Further, the CWC's definition includes munitions, devices, and other equipment specifically designed for the use of such chemical agents. Excluded from the scope of the CWC, however, are weapons based on living organisms of infective materials (including toxins produced by living organisms); they are covered by the 1972 Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction ([opened for signature on 10 April 1972, entered into force on 26 March 1975] 1015 UNTS 163; 'BWC'). Also, weapons whose primary injuring effects result from heat or pressure are not considered chemical weapons under the CWC; they are to some extent addressed by the Protocol on Prohibitions or Restrictions on the Use of Incendiary Weapons ([adopted 10 October 1980, entered into force 2 December 1983] 1342 UNTS 171) agreed upon within the framework of the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which may be Deemed to be Excessively Injurious or to have Indiscriminate Effects ([adopted 10 October 1980, entered into force 2 December 1983] 1342 UNTS 137).

B. Historical Development

5 Poisonous weapons have been used as a means of warfare from relatively early in history. In particular, the use of poisonous fumes is an old means of warfare. As early as 2000 BCE, they were used in India, and there are reports of poisonous fumes from burning pitch and sulphur being used in the Peloponnesian War (431–404 BCE).

6 Modern chemical weapons in various forms were the result of the 19th century when English

mass casualties, beginning with the battle of Ypres, Belgium, in 1915. Overall, more than one million casualties were attributed to the use of chemical weapons at the end of World War I.

7 Between the world wars, Spanish and French forces dropped mustard gas bombs in an attempt to put down the Berber rebellion in Spanish Morocco during the Rif War (1921–27). Also, chemical weapons were used by Italy in its conflict with Ethiopia (1935–36), arguably as a reprisal (→ *Reprisals*). Furthermore, they were applied indiscriminately by the Japanese Army in China, primarily sneeze and nausea gas (1937–38).

8 During World War II chemical weapons were not used in the European zone of military operations. However, Japan probably used them in Asia, among others in October 1941 during the battle of Zaoyang-Yichang, discontinuing the use after United States warnings of retaliation.

9 After World War II Egypt reportedly employed chemical weapons in the Yemeni Civil War (1963–67). Chemical weapons were used on a large scale by Iraq in the armed conflict with Iran (1980–88) (see also → *Iran-Iraq War [1980–88]*), and again by Iraq against its own Kurdish civilian population (1987–88). Most appalling was the attack on 17 March 1988, of the Kurdish village of Halabja by Iraqi forces with suspected nerve agents. It is noteworthy that the UN General Assembly, as early as 13 December 1982, authorized the United Nations Secretary-General to investigate, with the assistance of qualified experts, any related complaint concerning the use of chemical or biological weapons (UNGA Res 37/98 D 'Provisional Procedures to Uphold the Authority of the 1925 Geneva Protocol' [13 December 1982]). Several investigating missions sent out to enquire about alleged uses of chemical weapons by Iraq confirmed such use, with the first report being presented in 1984. The United Nations Security Council only condemned the use of chemical weapons by Iraq in 1988 (UNSC Res 612 [9 May 1988] and UNSC Res 620 [26 August 1988]).

10 Tear gas and herbicides were used by the United States, Australia, and South Vietnam during the Vietnam War (1964–75).

11 During the → *Iraq-Kuwait War (1990–91)*, Iraq, though in possession of chemical weapons, did not use them against coalition forces. While it had been suspected that one of the causes of the so-called 'Gulf War Syndrome', which has affected many soldiers who served in that conflict, might have been exposure to chemical weapons, it seems that medical protection against chemical weapons obviously contributed to the illness. Thus, a United States report of the federally mandated Research Advisory Committee on Gulf War Veterans' Illnesses released in 2008 concludes that use of pyridostigmine bromide pills, given to protect troops from effects of nerve agents, and pesticide use during deployment were the two conditions most closely linked to illness. Some researchers also linked certain symptoms to exposure to the destruction of the Khamisiyah weapons depot, where large quantities of sarin had been stored.

12 In light of scientific and technological advances and given new tactics, chemical weapons have also become of interest for terrorist organizations (→ *Terrorism*). Thus, in March 1995, terrorists belonging to a religious cult called Aum Shinrikyo released a form of sarin nerve gas in the subway system of Tokyo, Japan, during morning rush hour, killing 11 and injuring over 5,500 people.

13 On the other hand, non-lethal chemical weapons have regained the interest of States for the purpose of law enforcement, but also with regard to police-type operations abroad. Among others, in October 2002, the Russian authorities reportedly used non-lethal chemical weapons when storming a Moscow theatre in which Chechen rebels were holding hundreds of people hostage. There have also been discussions among the military of various States to write rules of engagement that would allow the military to use non-lethal riot agents in some situations.

C. The Potential of Chemical Weapons

14 Chemical weapons, as other weapons of mass destruction, are not only of military relevance but have increasingly developed a political potential. Obviously, their actual use has, over time, become less

against signing and ratifying the CWC as part of their campaign against the Israeli nuclear weapons programme (see also → *Nuclear Weapons and Warfare*).

15 Whether or not chemical weapons can be effectively used in combat depends on a variety of factors. These include their physical condition (gas, aerosol, liquid), the means of storage and delivery, the protective equipment necessary for military personnel involved, and the various characteristics of the battlefield, including wind, temperature, rain, and atmospheric stability. In order to enhance their military potential, one of the most important technological changes reducing and even avoiding risks inherent in the handling, storage, and disposal of chemical weapons, was the development of binary weapons technology. Binary chemical munitions, as developed in the 1980s, keep two precursor substances separate from each other until they are automatically mixed in shell to produce the agent immediatel before or during use. The development of binary weapons made it possible for high-tech armed force integrate chemical weapons into conventional weaponry. States with a less developed military potent had to primarily rely on the deterrent effect of chemical weapons.

16 It is sometimes argued that chemical weapons, by the end of the → *Cold War (1947–91)*, had lost much of their military and political potential, also bearing in mind questions of cost-effectiveness, and that such a limited role for chemical weapons eventually facilitated the adoption of the CWC and its entry into force. However, chemical weaponry has found its place in the concept of → *asymmetric warfare*, and as such is also relied upon by non-State actors. This is not only relevant for international, but even more so for non-international armed conflicts with a tiny borderline to situations of law enforcement (see also → *Armed Conflict, International*; → *Armed Conflict, Non-International*). This may also explain the renewed interest of the politico-military elite across the globe in so-called non-lethal weapons (particularly irritants) for tactical employment in cave systems and the taking of prisoners. Recent advances in genetic engineering and nanotechnology enhance the potential of chemical weapons in these fields. Altogether, there remain serious problems in controlling international trade in so-called dual-use chemicals, which have both commercial and military applications.

D. Regulation of Chemical Warfare

17 Due to a long history of use of chemical weapons in armed conflicts, political and legal efforts first concentrated on chemical warfare. These efforts included rules on the prohibition of specific weapons (→ *Weapons, Prohibited*) and the prohibition of certain methods of injuring the enemy.

18 Legal restraints on the use of chemical weapons in armed conflicts developed at the end of the 19th century, even though the 1675 Strasbourg Agreement and the so-called Brussels Declaration (Project of an International Declaration concerning the Laws and Customs of War [27 August 1874]) can be considered early attempts to limit the use of poisonous weapons. The Declaration concerning Expanding Bullets (→ *Hague Peace Conferences [1899 and 1907]*) was a first, but important step. This was followed by the prohibition of the use of poison under Art. 23 Hague Regulations (→ *Land Warfare*) which can be read as a general prohibition of chemical weapons. In light of the experiences in World War I, Art. 171 → *Versailles Peace Treaty (1919)* (225 CTS 188) took up and referred to an already existing prohibition of the use of 'asphyxiating, poisonous or other gases and all analogous liquids, materials or devices' and prohibited their manufacture and importation in Germany. This was an early effort to supplement the prohibition of the use of chemical weapons by arms control and disarmament measures, the need for which was only recognized after World War I.

19 On 6 February 1922, the Washington Treaty relating to the Use of Submarines and Noxious Gases in Warfare was signed, but never entered into force. Three years later, on 17 June 1925, the Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases, and of Bacteriological Methods of Warfare ('Geneva Protocol') was adopted. The parties to the Geneva Protocol confirm that 'the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices, has been justly condemned by the general opinion of the civilised world' and declare that:

> so far as they are not already Parties to Treaties prohibiting such use, accept this prohibition,

20 The Geneva Protocol, until the conclusion of the CWC, was the most important step towards the prohibition of chemical warfare. Using the language of the Versailles Peace Treaty, it can be read, notwithstanding interpretative controversies, as not only covering lethal or incapacitating agents but also irritating agents (such as tear-gas) and anti-plant agents (in particular, herbicides). By 1939, when World War II began, the Geneva Protocol had received 32 ratifications, and, as of 2009, 133 States were parties to it, after a wave of ratifications in the 1960s and 1970s following political pressure by the → *United Nations (UN)*. Numerous States have ratified the Geneva Protocol with a reservation of → *reciprocity* (see also → *Treaties, Multilateral, Reservations to*), among others, the United States of America, declaring upon deposit of its instrument of ratification in 1975:

> That the said Protocol shall cease to be binding on the Government of the United States with respect to the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials, or devices, in regard to an enemy State if such State or any of its allies fails to respect the prohibitions laid down in the Protocol.

21 On the basis of these ratifications, if a State uses chemical or biological weapons first, its enemies are free from their treaty obligations under the Geneva Protocol. Many States have meanwhile withdrawn their reservations, not least in light of Art. 1 (1) (c) CWC, which clearly states that: '[e]ach State Party to this Convention undertakes never under any circumstances:…to use chemical weapons'. Thus, the use of chemical weapons in belligerent reprisals is inconsistent with the CWC.

22 It has to be stressed that the prohibition of chemical warfare, based on solid evidence of State *opinio iuris* specifically relating to chemical weapons, is also rooted in → *customary international law*, closely linked to the customary prohibition of the use of poison. This prohibition, which had already been developed in the 1920s and 1930s, not only covers lethal and incapacitating agents, but extends to irritants as well. Evidence of *opinio iuris* can be found in numerous declarations of State representatives and international bodies during the inter-war period, in particular related to the draft treaty discussed at the Disarmament Conference of the → *League of Nations* in 1933 (→ *Disarmament*). Furthermore, since World War I, chemical warfare has always met severe → *protest*[s] from other States and the international community. *Opinio iuris* has been confirmed in many debates and numerous resolutions in the United Nations. It is noteworthy that States emphasized the continuing importance and validity of the prohibition included in the 1925 Geneva Protocol when adopting the Final Declaration of the Conference of States Parties to the 1925 Geneva Protocol to the Hague Conventions and other Interested States on the Prohibition of Chemical Weapons, held at Paris on 7–11 January 1989. Up until the adoption of the CWC in 1993, however, the customary prohibition of chemical warfare must, in light of declarations by States reserving their right to use chemical weapons as retaliation in kind, also be regarded as being subject to reciprocity.

23 The prohibition on chemical warfare is supported by general rules on methods of warfare. Among these rules, the prohibition of attacks against the civilian population (→ *Civilian Population in Armed Conflict*), of → *indiscriminate attack*[s], and of attacks causing excessive damage to civilian populations or civilian objects (in relation to the military advantage anticipated; → *Proportionality*) are particularly relevant.

24 Even though the CWC has strengthened the prohibition of chemical warfare, the specific issue of herbicides and renewed interest in non-lethal chemical agents put the completeness of the prohibition to a test. Irrespective of the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques ([adopted 10 December 1976, entered into force 5 October 1978] 16 ILM 90; 'ENMOD') which aims to protect mankind against techniques for changing the environment and of Art. 35 (3) Additional Protocol I (1125 UNTS 3), prohibition of the use of 'methods or means of warfare which are intended, or may be expected, to cause widespread, long-term, and severe damage to the natural environment' (→ *Environment, Protection in Armed Conflict*), the prohibition of herbicidal warfare is less firm than might be expected. Even though neither of the two instruments explicitly prohibits the use of herbicides as a means of warfare, the CWC, in its preamble, only recognizes 'the prohibition, embodied in the pertinent agreements and relevant principles of international law, of the use of herbicides as a method of warfare'.

the generally recognized rules of international law' (UNGA Res 2603 A [XXIV] 'Question of Chemical and Bacteriological [Biological] Weapons' [16 December 1969]).

26 While the CWC clearly prohibits the use of riot control agents as a method of warfare (Art. 1 (5) CWC), its definition of purposes not prohibited under the Convention (Art. 2 (9) (d) CWC) also refers to 'law enforcement including domestic riot control purposes'.

27 The extent to which riot control agents can be used in UN-based or other types of → *peacekeeping* or peace-enforcement operations (→ *International Administration of Territories*) seems to be considered as a grey area by some States.

E. Arms Control and Disarmament

28 The need to supplement the prohibition of the use of chemical warfare by → *arms control* and disarmament measures was first recognized in Art. 171 Treaty of Versailles. Further efforts of the League of Nations to achieve chemical weapons disarmament during the inter-war period failed. After World War II, the Federal Republic of Germany and Austria renounced the possession of chemical weapons. This was done on the basis of the 1954 Paris Protocol III to the Brussels Treaty (211 UNTS 364; → *Western European Union [WEU]*) and the → *Austrian State Treaty (1955)*, respectively. After the Vietnam War, the 1977 ENMOD was adopted in order to protect mankind against methods of warfare based upon changes of the environment.

29 In light of the protracted negotiations for the CWC, the United States and the Soviet Union, in 1990, concluded an Agreement on Destruction and Non-Production of Chemical Weapons and on Measures to Facilitate the Multilateral Convention on Banning Chemical Weapons ('Agreement'), providing for the immediate cessation of the production of chemical weapons and the progressive destruction of their stocks. According to this Agreement, 50% of each State's aggregate stock is to be destroyed by 31 December 1999, and a final level of not more than 5,000 agent tons to be reached by 31 December 2002. Destruction and former production and storage facilities are subject to on-site inspection by the other party. By mid-1996 Russia chose to back away from this bilateral agreement, leaving the whole matter for the CWC, which entered into force in 1997.

30 The CWC, after 24 years of negotiations, was adopted in 1993. In light of its scope and complexity it is not only an effective combination of the prohibition of chemical warfare and of chemical arms control and disarmament, but must also be considered one of the most significant agreements to counter the proliferation of weapons of mass destruction apart from the Treaty on the Non-Proliferation of Nuclear Weapons ([adopted 1 July 1968, entered into force 5 March 1970] 729 UNTS 161). By 2009, only seven States had not ratified the CWC, with Israel and Myanmar being signatories, and only Angola, the Democratic People's Republic of Korea, Egypt, Somalia, and the Syrian Arab Republic not even having signed.

31 The CWC prohibits the development, production, stockpiling, and use of chemical weapons, and it sets up the Organization for the Prohibition of Chemical Weapons ('OPCW'), located in The Hague, to be responsible for its implementation. Based upon a broad definition of chemical weapons, applying the general-purpose criterion (civilian uses and protective military uses are not prohibited), and providing for the destruction of chemical weapons and chemical weapons production, the CWC regime is strengthened by a comprehensive verification mechanism, including routine and ad hoc procedures, detailed by the OPCW's Verification Annex. The overall purpose of this mechanism is to generate confidence among the parties to the CWC that the benefits of accepting the obligations of the OPCW outweigh the costs. It is noteworthy that the verification regime is the main difference between a strong CWC and a weak BWC.

32 Routine verification is the primary means of ensuring compliance with the provisions of the Convention. It is based on a division of labour between the Technical Secretariat of the OPCW and the parties to the CWC. States Parties have to submit initial and annual declarations (Arts 3, 6 CWC), among others, on past and present chemical weapons programmes, on old and abandoned chemical weapons, and

33 The second type of inspection foreseen by the CWC is of an ad hoc nature. Each State Party to the CWC enjoys the right to request the Director-General to undertake, at short notice, an OPCW inspection on the territory of any State or at any location under the jurisdiction or control of any other State Party, in order to clarify and resolve any questions of possible non-compliance (Art. 9 (8)–(25) CWC). It is noteworthy, that these challenge inspections can only be stopped by a two-thirds majority vote by the OPCW Executive Council. In addition to these challenge inspections, there is the possibility of investigating, at the request of a State Party, an alleged use of chemical weapons. This may serve either to confirm the actual use or threat of use of chemical weapons, or to assess the need for assistance, or both.

34 With regard to destruction, the Convention requires States possessing chemical weapons to totally destroy their stocks within a period of 10 years, with the possibility of applying for extensions, but no after April 2012. The CWC ensures that all possessor States destroy their stockpiles at approximately same rate ('levelling out' principle). For the purposes of destruction as well as for on-going verificatio purposes, the CWC distinguishes three classes of controlled substances, ranging from those which ha little or no use outside of chemical weapons (Schedule 1 chemicals) to those which have large-scale legitimate uses apart from chemical weapons (Schedule 3 chemicals). So far, CWC has achieved a lot in terms of destroying the stockpiles of a number of possessor States, including India, Albania, and Libya. Problems, however, exist with regard to the largest stockpiles in the United States and in Russia. Due to serious technical, environmental, and financial problems, the time limits originally envisaged for the destruction of chemical weapons under the CWC have already been extended. However, as has become clear in late 2009, there is little chance either the United States or the Russian Federation will complete destruction of their chemical weapons stockpiles prior to 29 April 2012, the date when the CWC demands that all remaining stocks be destroyed. Even though both will have processed more than two-thirds of their stockpiles by that date, and they have made commitments to continue destruction as required after that date until total destruction is completed as soon as safely and ecologically possible, some legal problems pertain. This is due to the fact that the CWC, technically, has no means to extend the deadline for destruction further and that there will be a legal lapse of compliance. Since this lack of compliance, however, is neither covert nor unknown, and since it is of no danger to the object and purpose of the Convention, the parties to the CWC should be able to accommodate the delay without weakening the overall regime.

35 Whereas the CWC is a major step towards establishing a workable barrier against chemical weapons, some issues still give rise to problems. These include the destruction of chemical weapons in an environmentally sound manner. However, more serious are attempts of non-State actors to make use of chemical weapons politically or militarily. Early steps curbing proliferation of chemical weapons had already been taken in the 1980s, with many States and the European Community adopting stricter export control measures for chemical weapons, and even more so chemicals which might be used as, or converted into, such weapons and equipment which might be used for their production. Co-ordination of these export controls was organized through the so-called 'Australia group'. Export controls alone, however, seem to be very limited in their effectiveness, even if supported by multilateral efforts such as UNSC Res 1540 (28 April 2004) on the non-proliferation of weapons of mass destruction. This is why universality of CWC membership is essential.

F. Evaluation and Outlook

36 The latest use of chemical weapons occurred in 2013 during the Syrian civil war. Whereas the parties to the conflict blamed each other, none admitted the attacks. A UN fact-finding mission, including OPCW and World Health Organization ('WHO') components, established by the Secretary-General on the basis of UNGA Res 42/37 C (30 November 1987) and UNSC Res 620 (26 August 1988), investigated the attacks (UN Doc A/68/663-S/2013/735), as did the UN Human Rights Council's Commission of Inquiry (UN Doc A/HRC/24/46, UN Doc A/HRC/25/65). Further investigations were conducted by the OPCW in 2014 and 2015 (UN Doc S/2015/908). The UN and the OPCW set up a Joint Investigative Mechanism in 2015 on the basis of UNSC Res 2235 (7 August 2015). Syria acceded to the CWC on 14 September 2013, and agreed to its provisional application pending entry into force on 14 October 2013. The declared Syrian stockpile was

37 With Somalia joining in 2013 and Myanmar and Angola in 2015, only five entities currently stay outside the CWC, namely Egypt, Israel (having signed in 1993, but not yet ratified), North Korea, South Sudan, and the Palestinian Authority.

38 Efforts to eliminate a whole category of weapons and to eliminate chemical warfare have been impressive. It can be argued that the entry into force of the CWC and the establishment of the OPCW are the most far-reaching legal efforts to this end. However, as recent developments illustrate, even the most refined legal techniques and the broadest possible political agreement on those issues are not the end of the matter. Some recent developments have put the regime under pressure and seem to test its strength and reliability, including the use of herbicides and riot-control agents, as well as the availability of chemical weapons to non-State actors. It must therefore be understood that the prohibition of chemi warfare and chemical weapons disarmament are on-going processes. Further efforts are necessary to strengthen and safeguard the global regime against chemical weapons.

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