

**Meeting of the States Parties to the Convention  
on the Prohibition of the Development,  
Production and Stockpiling of Bacteriological  
(Biological) and Toxin Weapons and on Their  
Destruction**

12 November 2018

Original: English

---

**2018 Meeting  
Geneva, 4-7 December 2018**

**Meeting of Experts on Review of developments in the field  
of science and technology related to the Convention  
Geneva, 9-10 August 2018  
Item 9 of the agenda  
Adoption of the factual report reflecting the deliberations  
of the meeting, including possible outcomes**

**Report of the 2018 Meeting of Experts on review of  
developments in the field of science and technology related to  
the Convention**

**I. Introduction**

1. At the Eighth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction (BWC/CONF.VIII/4), States Parties decided to hold annual meetings and that the first such meeting, in December 2017, would seek to make progress on issues of substance and process for the period before the next Review Conference, with a view to reaching consensus on an intersessional process.

2. At the Meeting of States Parties in December 2017, States Parties reached consensus on the following:

“(a) Reaffirming previous intersessional programmes from 2003-2015 and retaining the previous structures: annual Meetings of States Parties preceded by annual Meetings of Experts.

(b) The purpose of the intersessional programme is to discuss, and promote common understanding and effective action on those issues identified for inclusion in the intersessional programme.

(c) Recognising the need to balance an ambition to improve the intersessional programme within the constraints — both financial and human resources — facing States Parties, twelve days are allocated to the intersessional programme each year from 2018- 2020. The work in the intersessional period will be guided by the aim of strengthening the implementation of all articles of the Convention in order to better respond to current challenges. The Meetings of Experts for eight days will be held back to back and at least three months before the annual Meetings of States Parties of four days each. Maximum use would be made of the Sponsorship Programme funded by voluntary contributions in order to facilitate participation of developing States Parties in the meetings of the intersessional programme.

(d) The meetings of the MSP will be chaired by a representative of the EEG in 2018, a representative of the Western Group in 2019 and a representative of the



Group of Non-Aligned Movement and Other States in 2020. The annual Chair will be supported by two annual vice-chairs, one from each of the other two regional groups. In addition to the reports of the Meetings of Experts, the Meetings of States Parties will consider the annual reports of the ISU and progress on universality. The Meetings of Experts will be chaired in 2018 by [the Group of the Non-Aligned Movement and Other States Parties to the BWC] (MX 1 and MX 2) and the Western Group (MX 3 and MX4), in 2019 by EEG (MX1 and MX 2) and NAM (MX 3 and MX 4), and in 2020 by Western Group (MX 1 and MX 2) and by EEG (MX 3 and MX 4); MX 5 will be chaired by the regional group chairing the MSP.

	<i>MSP</i>	<i>MX 1</i>	<i>MX 2</i>	<i>MX 3</i>	<i>MX 4</i>	<i>MX 5</i>
2018	EEG	NAM	NAM	WG	WG	EEG
2019	WG	EEG	EEG	NAM	NAM	WG
2020	NAM	WG	WG	EEG	EEG	NAM

All meetings will be subject *mutatis mutandis* to the rules of procedure of the Eighth Review Conference.

(e) The Meetings of Experts would be open-ended and will consider the following topics:

[...]

**MX2 (2 days): Review of developments in the field of science and technology related to the Convention:**

- Review of science and technology developments relevant to the Convention, including for the enhanced implementation of all articles of the Convention as well as the identification of potential benefits and risks of new science and technology developments relevant to the Convention, with a particular attention to positive implications;
- Biological risk assessment and management;
- Development of a voluntary model code of conduct for biological scientists and all relevant personnel, and biosecurity education, by drawing on the work already done on this issue in the context of the Convention, adaptable to national requirements;
- In 2018, the MX2 will address the specific topic of genome editing, taking into consideration, as appropriate, the issues identified above;
- Any other science and technology developments of relevance to the Convention and also to the activities of relevant multilateral organizations such as the WHO, OIE, FAO, IPPC and OPCW.

[...]

(f) Each Meeting of Experts will prepare for the consideration of the annual Meeting of States Parties a factual report reflecting its deliberations, including possible outcomes. All meetings, both of Experts and of States Parties will reach any conclusions or results by consensus. The Meeting of States Parties will be responsible for managing the intersessional programme, including taking necessary measures with respect to budgetary and financial matters by consensus with a view to ensuring the proper implementation of the intersessional programme. The Ninth Review Conference will consider the work and outcomes it receives from the Meetings of States Parties and the Meetings of Experts and decide by consensus on any inputs from the intersessional programme and on any further action.”

3. By resolution 72/71, adopted without a vote on 4 December 2017, the General Assembly, *inter alia*, requested the Secretary-General to continue to render the necessary

assistance to the depositary Governments of the Convention and to continue to provide such services as may be required for the implementation of the decisions and recommendations of the review conferences.

## II. Organization of the Meeting of Experts

4. In accordance with the decisions of the Eighth Review Conference and the 2017 Meeting of States Parties, the 2018 Meeting of Experts on Review of Developments in the Field of Science and Technology Related to the Convention was convened at the Palais des Nations in Geneva from 9 to 10 August 2018, chaired by Mr. Pedro Luiz Dalcerro, Minister-Counsellor of Brazil.

5. The Meeting of Experts adopted its agenda (BWC/MSP/2018/MX.2/1) as proposed by the Chair. The Chair also drew the attention of delegations to a background paper prepared by the Implementation Support Unit (BWC/MSP/2018/MX.2/2).

6. Following a suggestion by the Chair, the Meeting of Experts adopted as its rules of procedure, *mutatis mutandis*, the rules of procedure of the Eighth Review Conference, as contained in document BWC/CONF.VIII/2.

7. Mr. Daniel Feakes, Chief, Implementation Support Unit, Office for Disarmament Affairs, Geneva, served as Secretary of the Meeting of Experts. Mr. Hermann Lampalzer, Political Affairs Officer, Implementation Support Unit, served as Deputy Secretary and Ms. Ngoc Phuong van der Blij, Political Affairs Officer, also served in the secretariat.

## III. Participation at the Meeting of Experts

8. 96 States Parties to the Convention participated in the Meeting of Experts as follows: Algeria, Angola, Argentina, Australia, Austria, Bahrain, Belarus, Belgium, Bosnia and Herzegovina, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Cuba, Cyprus, Czechia, Denmark, Ecuador, El Salvador, Estonia, Finland, France, Georgia, Germany, Ghana, Greece, Guatemala, Holy See, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Italy, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lebanon, Lithuania, Madagascar, Malaysia, Mali, Malta, Mexico, Montenegro, Morocco, Myanmar, Nepal, Netherlands, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, San Marino, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Sweden, Switzerland, the Former Yugoslav Republic of Macedonia, Togo, Trinidad and Tobago, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America, Venezuela (Bolivarian Republic of), Yemen, and Zimbabwe.

9. In addition, two States that had signed the Convention but had not yet ratified it participated in the Meeting of Experts without taking part in the making of decisions, as provided for in rule 44, paragraph 1 of the rules of procedure: Haiti and the United Republic of Tanzania.

10. One State, Israel, neither a party nor a signatory to the Convention, participated in the Meeting of Experts as an observer, in accordance with rule 44, paragraph 2.

11. The United Nations, including the United Nations 1540 Committee Group of Experts, the United Nations Institute for Disarmament Research (UNIDIR), the United Nations Interregional Crime and Justice Research Institute (UNICRI), and the United Nations Office for Disarmament Affairs (UNODA), attended the Meeting of Experts in accordance with rule 44, paragraph 3.

12. The Caribbean Community, the European Union, the International Centre for Genetic Engineering and Biotechnology (ICGEB), the International Committee of the Red Cross (ICRC), the International Science and Technology Center (ISTC), the Organisation for the Prohibition of Chemical Weapons (OPCW), the World Health Organization (WHO)

and the World Organisation for Animal Health (OIE) were granted observer status to participate in the Meeting of Experts in accordance with rule 44, paragraph 4.

13. In addition, at the invitation of the Chair, in recognition of the special nature of the topics under consideration at this Meeting and without creating a precedent, two scientific, professional, commercial and academic organizations and experts participated in informal exchanges in the open sessions as guests of the Meeting of Experts: Professor Michael Imperiale, University of Michigan, and Professor Weiwen Zhang, Tianjin University.

14. 26 non-governmental organizations and research institutes attended the Meeting of Experts under rule 44, paragraph 5.

15. A list of all participants in the Meeting of Experts is contained in document BWC/MSP/2018/MX.2/INF.1.

#### **IV. Work of the Meeting of Experts**

16. In accordance with the provisional agenda (BWC/MSP/2018/MX.2/1) and an annotated programme of work prepared by the Chair, the Meeting of Experts had substantive discussions on the issues allocated by the 2017 Meeting of States Parties.

17. Under agenda item 4 (“Review of science and technology developments relevant to the Convention, including for the enhanced implementation of all articles of the Convention as well as the identification of potential benefits and risks of new science and technology developments relevant to the Convention, with a particular attention to positive implications”), the United States of America introduced working paper BWC/MSP/2018/MX.2/WP.5 and Professor Michael Imperiale of the University of Michigan, made a presentation, speaking as a “Guest of the Meeting”. There then followed an interactive discussion on the agenda item in which the following States Parties participated: India, Nepal, Pakistan, Philippines, Romania, Saudi Arabia, Spain, Switzerland, United Kingdom of Great Britain and Northern Ireland, United States of America, Venezuela (Bolivarian Republic of) on behalf of the Group of the Non-Aligned Movement and Other States Parties to the BWC. Various views were expressed during the consideration of this agenda item.

18. Under agenda item 5 (“Biological risk assessment and management”), an interactive discussion on the agenda item took place in which the following States Parties participated: India, Iran (Islamic Republic of), Mali, Netherlands, Saudi Arabia, Spain, Sweden, United Kingdom of Great Britain and Northern Ireland, United States of America, and Venezuela (Bolivarian Republic of) on behalf of the Group of the Non-Aligned Movement and Other States Parties to the BWC. Various views were expressed during the consideration of this agenda item.

19. Under agenda item 6 (“Development of a voluntary model code of conduct for biological scientists and all relevant personnel, and biosecurity education, by drawing on the work already done on this issue in the context of the Convention, adaptable to national requirements”), Germany introduced working paper BWC/MSP/2018/MX.2/WP.1 and China introduced a joint working paper with Pakistan, BWC/MSP/2018/MX.2/WP.9. France and Japan delivered technical presentations and Professor Weiwen Zhang, Tianjin University, made a presentation speaking as a “Guest of the Meeting”. There then followed an interactive discussion on the agenda item in which the following States Parties participated: Australia, China, Cuba, Germany, India, Iran (Islamic Republic of), Netherlands, Pakistan, Romania, Russian Federation, Spain, Switzerland, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, and Venezuela (Bolivarian Republic of) on behalf of the Group of the Non-Aligned Movement and Other States Parties to the BWC. There were also technical presentations from the United Nations Interregional Crime and Justice Research Institute (UNICRI) and the Organisation for the Prohibition of Chemical Weapons (OPCW). Various views were expressed during the consideration of this agenda item.

20. Under agenda item 7 (“Genome editing, taking into consideration, as appropriate, the issues identified above”), Switzerland, Australia, the United Kingdom of Great Britain

and Northern Ireland and the Islamic Republic of Iran introduced working papers BWC/MSP/2018/MX.2/WP.2, BWC/MSP/2018/MX.2/WP.3, BWC/MSP/2018/MX.2/WP.4 and BWC/MSP/2018/MX.2/WP.6 respectively. There then followed an interactive discussion on the agenda item in which the following States Parties participated: France, India, Netherlands, Romania, Switzerland, United Kingdom of Great Britain and Northern Ireland, United States of America, and Venezuela (Bolivarian Republic of) on behalf of the Group of the Non-Aligned Movement and Other States Parties to the BWC. Various views were expressed during the consideration of this agenda item.

21. Under agenda item 8 (“Any other science and technology developments of relevance to the Convention and also to the activities of relevant multilateral organizations such as the WHO, OIE, FAO, IPPC and OPCW”)<sup>1</sup>, there was an interactive discussion on the agenda item in which the following States Parties participated: Brazil, India, Iran (Islamic Republic of), Mexico, Philippines, Switzerland, United Arab Emirates, and the United Kingdom of Great Britain and Northern Ireland. There was a statement by the European Union. There were also technical presentations from the Organisation for the Prohibition of Chemical Weapons (OPCW), the World Organization for Animal Health (OIE), and the Group of Experts under United Nations Security Council resolution 1540 (2004). Various views were expressed during the consideration of this agenda item.

22. In the course of its work, the Meeting of Experts was able to draw on a number of working papers submitted by States Parties and international organizations, as well as on statements and presentations made by States Parties, international organizations and guests of the Meeting, which were circulated in the Meeting.

23. The Chair, under his own responsibility and initiative, has prepared a paper listing considerations, lessons, perspectives, recommendations, conclusions and proposals drawn from the presentations, statements, working papers and interventions on the agenda items under discussion at the Meeting. The Meeting of Experts noted that this paper had not been agreed and had no status. It was the Chair’s view that the paper could assist delegations in their preparations for the Meeting of States Parties in December 2018 and those in the remaining years of the intersessional programme and in succeeding Meetings of Experts on Review of Developments in the Field of Science and Technology Related to the Convention in the intersessional programme in 2019 and 2020 and also in their consideration of how best to “discuss, and promote common understanding and effective action on” the topics in accordance with the consensus reached at the 2017 Meeting of States Parties. The paper prepared by the Chair, in consultation with States Parties, is attached as annex I to this report.

## V. Documentation

24. A list of official documents of the Meeting of Experts, including the working papers submitted by States Parties, is contained in annex II to this report. All documents on this list are available on the BWC website at <http://www.unog.ch/bwc> and through the United Nations Official Document System (ODS), at <http://documents.un.org>.

## VI. Conclusion of the Meeting of Experts

25. At its closing meeting on 10 August 2018, the Meeting of Experts adopted its report by consensus, as contained in document BWC/MSP/2018/MX.2/CRP.1 as orally amended, to be issued as document BWC/MSP/2018/MX.2/3.

<sup>1</sup> IPPC: International Plant Protection Convention

## Annex I

### Summary report

#### **Submitted by the Chairman of the Meeting of Experts on Review of Developments in the Field of Science and Technology Related to the Convention**

1. The chairperson under his own responsibility and initiative has prepared this paper which lists considerations, perspectives, and conclusions drawn from the presentations, statements, working papers and interventions on the agenda items under discussion at the Meeting. The Meeting of Experts noted that this paper had not been agreed and had no status. It is the Chair's view, however, that the paper could assist delegations in their preparations for the Meeting of States Parties in December 2018 and those in the remaining years of the intersessional programme and also in succeeding Meetings of Experts on Review of Developments in the Field of Science and Technology Related to the Convention in the intersessional programme in 2019 and 2020.

2. The Chairperson would like to express his gratitude to delegations for their active participation in the Meeting, particularly for the various working papers that were submitted and which together with oral statements and the constructive debate, as well as the interventions by relevant international organizations have served as the basis for this summary report. The report of the Meeting details which delegations spoke under the different agenda items, and which delegations introduced working papers, so such information will not be repeated in this summary report. Discussions cut across the different agenda items, as some of the issues are intertwined and science and technology impacts on various articles of the Convention.

3. The meeting was honored by the presence of the Director-General of UNOG, Mr. Michael Møller, who spoke on the interrelated aspects of MX2 with the Disarmament Agenda ("Securing Our Common Future") launched by the Secretary-General of the United Nations, as its relevance for the achievement of the Sustainable Development Goals.

4. Bearing in mind that MX2 was basically a dialogue between scientists and policymakers under the framework of the Intersessional Programme (2017-2020) of the Biological Weapons Convention, the following paragraphs summarize and synthesize substantive discussions under agenda items 4 to 8.

#### **I. Agenda item 4. Review of science and technology developments relevant to the Convention, including for the enhanced implementation of all articles of the Convention as well as the identification of potential benefits and risks of new science and technology developments relevant to the Convention, with a particular attention to positive implications**

5. A number of States Parties took the floor under this agenda item, including one which presented a working paper, as well as a Guest of the Meeting. Various technologies were reviewed, including gene editing, metabolic pathway engineering, gene drives, and gene synthesis. During the discussions, it was noted that advances in science and technology are transforming the world and bring with them many benefits, for example in medical fields for the purposes of prevention, diagnosis, and treatment of diseases and it was noted that applications of genome editing technology in medical, pharmaceutical, industrial and agricultural fields have contributed to economic growth. The dual-use nature of many of these technologies, which arouses concerns about potential malicious uses and

applications that are forbidden by the BWC was also noted. A note of caution was raised about the rapid commercial application of the CRISPR/cas technology, before a clear assessment of middle and long-term effects on edited organisms. The inherent connection between the resilience of public health systems and issues of biosafety and biosecurity, especially in developing countries, was also highlighted. Nevertheless, most States Parties noted that such advances should not be seen as threats in themselves and there should not be restrictions on scientific exchange and technology transfer, especially for developing countries, carried out in a transparent manner in compliance with international guidelines.

6. Other States Parties focused in advances in science and technology which could pose risks to the BWC and its implementation. While new biotechnology tools can benefit human, agricultural and environmental health, they could also expand capabilities for the potential development of biological weapons. The rapid advances in science and technology can make it difficult for policymakers and regulators to distinguish between what might be possible as opposed to what might be probable in the context of biological weapons. Furthermore, several States Parties referred to the convergence of technologies, for example, chemistry and biology, which can create additional challenges for the implementation of the BWC. Some also noted the unpredictability of advances in science and technology, pointing out that the implications of some developments are sometimes not possible to anticipate. Finally, it was noted by some States Parties that knowledge sharing and technology transfer would contribute to capacity-building in developing States Parties and reduce the gap between developed and developing States Parties.

7. The rich discussion at MX2 demonstrated that advances, including in the area of genome editing, are and can be of great benefit, but not without some risks. The MSP could note this and call for governments, research institutions, scientists, and others involved in research in the life sciences to take an approach to that research that balances these benefits and risks, taking into account its potential to be misused in ways that are prohibited by the Convention.

## **II. Agenda item 5. Biological risk assessment and management**

8. Under this agenda item, the following questions were suggested to structure a debate about biological risk assessment and management: What are we concerned about? How should we assess the risks? How should we manage the risks? Some States Parties noted that there is a need for the development and implementation of biosafety and biosecurity policies and approaches at the national level. It was however indicated that there is no commonly agreed definition of biosafety and biosecurity in the Convention and the rapid development of new technologies including genome editing and synthetic biology creates new grey zones between the two of them. It was also mentioned that in order to benefit developing countries and to achieve harmonisation, it is necessary to develop broad guiding principles for bio risk assessment and management on issues specific to BTWC, which could then be adapted to national contexts. In this respect, some States Parties referred to increasing international research collaborations and the potential global consequences of the misuse of advances in the biosciences and therefore stated that it is desirable to discuss and find ways to harmonize national practices which could be done in the context of the BWC. In this regard, the desirable harmonization of techniques should not constitute a fit-for-all methodology of risk assessment. The Cartagena Protocol on Biosafety of the Convention on Biological Diversity, was mentioned as a possible source of inspiration for further work on the subject within the framework of the BWC. Additionally, it was noted that achieving the necessary standards in the fields of biosafety and biosecurity requires capacity-building, and is facilitated by international cooperation through the full and effective implementation of Article X.

9. At the level of scientific institutions, it was noted that they have an ethical and legal responsibility to ensure that biosecurity standards are maintained and for instilling a positive and transparent culture. Strong institutional oversight of projects, restricted access to harmful microorganisms, and clear reporting mechanisms for documenting possible risks could help to prevent either unintentional or malicious misuse. Some States Parties also noted that there could be a role for self-governance which has the advantage that

researchers' have a high level of familiarity with the given subject and the fact that it can allow for a more flexible response than regulation and legislation.

10. In terms of assessing the capability for the malicious use of biotechnology, various factors were noted, for example, the nature and capability of the technology itself, its potential use as a weapon and its scope of damage or impact. However, it was also pointed out that these factors must be weighed against the factors available for mitigation, which could include the ability to recognize that an attack with biological weapons has occurred, and the prevention of misuse.

11. Having reviewed the potential benefits and risks of advances in science and technology at the 2018 Meeting of Experts, States Parties may be now in a better position to examine biological risk assessment in future meetings. Some delegations defended that the MSP could call on the 2019 Meeting of Experts not only to consider any updates to scientific and technological advances but also to devote additional attention to risk assessment. Then, the 2020 Meeting of Experts could focus on how to manage the risks identified, the other aspect of its second agenda item. In this regard, some other delegations understood that, if the MSP in 2018 decides to include risk assessment in the 2019 Meeting of Experts, it should be discussed on a equal footing with other issues.

### **III. Agenda item 6. Development of a voluntary model code of conduct for biological scientists and all relevant personnel, and biosecurity education, by drawing on the work already done on this issue in the context of the Convention, adaptable to national requirements**

12. Several States Parties noted that the subject of this agenda item had been discussed within the BWC for many years. There was a presentation by a Guest of the Meeting and two delegations presented working papers, one of them on a voluntary national code covering the sciences and humanities, while the other on a proposal for a specific voluntary code of conduct for biological scientists within the BWC framework. This proposal considers that bio researchers are not only at the forefront of biosciences and biotechnology but also constitute a primary line of defense against misuse. Many States Parties spoke in favor of the need for voluntary codes of conduct, and several States Parties described national examples of such codes. It was emphasized that codes of conduct could be a useful tool to raise awareness among scientists about the risks of misuse, while taking into account the right balance between scientific freedom (a major driver of economic development), on one hand, and the potential risks posed by research outcomes being maliciously used by non-state actors or as a weapon of war, on the other.

13. Many States Parties also expressed the view that any such code of conduct should be voluntary in nature, but that it should be developed with the active participation of the scientific community to ensure that it has feasibility and is seen as being relevant to those at whom it is aimed. Some also stressed that codes of conduct should apply to scientists in the private sector as well, and also to those in the so-called "DIY" laboratories. Furthermore, an international code of conduct should respect national legislations and do not hamper the flow of scientific information.

14. It should be acknowledged that some countries have mixed regulations, and legal provisions with voluntary guidelines at the national level. Many of the States Parties which described their own national codes of conduct emphasized that such codes by themselves are not sufficient but are a useful part of a concerted governance system. They stressed the importance of promoting a broad culture of responsibility and giving particular emphasis to education to complement codes of conduct. States Parties also noted that it was important to reach beyond scientific communities and to encourage a dialogue with society at large, particularly when ethical issues are raised. Some States Parties noted that codes of conduct could be used to promote international cooperation and scientific exchange and also stated that such codes should not result in any restrictions on international scientific cooperation.



15. States Parties showed considerable interest in this topic during the Meeting of Experts, with some of them noting that the 2005 Meeting of Experts had also considered codes of conduct. A group of States Parties emphasized the need for the scientific community to be involved in the development of codes relevant for the BWC, adding that codes of conduct should complement regulations of biological research and development, rather than replacing them. A large number of States Parties expressed the view that the issue of codes of conduct was a topic on which progress could be made, with some States Parties considering that the MSP in 2018 could call for continued discussion on proposals and suggestions related to this topic. The participation of the scientific community in the discussion should take place during the intersessional programme, without pre-established timelines, and within a negotiation process led by States Parties.

#### **IV. Agenda item 7. Genome editing, taking into consideration, as appropriate, the issues identified above**

16. A number of States Parties addressed this agenda item and also submitted working papers. It was noted that genome editing, particularly techniques such as CRISPR, is opening new avenues in many scientific fields. For example, CRISPR technology is already being developed to prevent and treat disease in humans, to modify plants to deal with the impacts of climate change and plant pathogens, and to halt the spread of viruses in animal populations. Genome editing is an extremely dynamic field and, many States Parties, therefore, acknowledged the need to review developments and to stay informed. There was a technical clarification on the differences between GMOs, in which genes from other species are imported to a target organism, and gene editing, that alter the structure of DNA without manipulating material from other organisms. In this regard, it was noted that the main risk comes from the editing of known pathogens whose genome sequencing is publicly available. It was also stated that synthetic biology is moving forward at a pace which includes dual-use technology, which poses risks that are not yet adequately assessed by the international community. The security implications of genome editing are uncertain and difficult to predict, especially the already observed development of enhanced resistances in genetically edited organisms. Gene editing could make the acquisition, development, and production of biological weapons easier; it could also help to counter such risks, for example through the design of more effective medical countermeasures, or through improved means of detection.

17. States Parties noted that advances in genome editing need to be looked at together with developments in other relevant fields. In assessing both potential benefits and risks of genome editing, States Parties acknowledged that it is important to consider the present and future limitations of the technology and what barriers would have to be overcome to address the challenges. It was noted that increased transparency and sharing of information on the experiences of States Parties in managing the risks associated with gene editing, including through regulation, could be a useful way to strengthen the BWC and maintain its relevance. It was also emphasized that the benefits of genome editing should be widely shared among all States Parties and that exchange of the relevant knowledge and equipment should not be restricted. Some States Parties expressed the view that common understandings regarding the facilitation of cooperation in the area of genome editing among States Parties should be promoted with a view to agreeing on the effective action in this regard.

#### **V. Agenda item 8 - Any other science and technology developments of relevance to the Convention and also to the activities of relevant multilateral organizations such as the WHO, OIE, FAO, IPPC, and OPCW**

18. Under this agenda item, States Parties considered other science and technology developments of relevance to the Convention such as in neuroscience and nucleic acid origami. Some States Parties raised the topic of synthetic biology, pointing out that while

the risk remains small at this stage, the consequences of the misuse of synthetic biology could be considerable. Therefore, it was proposed that synthetic biology should be considered by the Meeting of Experts in 2019. States Parties also referred to the convergence of various disciplines which has the potential to create both risks and benefits to the BWC. In addition, it was noted that advances in microbial forensics could enhance capabilities for investigations of alleged use of biological weapons, and also help to distinguish natural and deliberate disease outbreaks.

19. The importance of continuing to keep all such developments of relevance to the BWC was emphasized by many States Parties, and some ways in which to do so were described, for example, regional workshops, increased interaction with the private sector, continued cooperation with relevant international organizations such as the WHO, OIE, FAO, IPPC, and OPCW, as well as active involvement with the global scientific community. States Parties also raised the importance of ensuring that legitimate uses of biology are not hampered and that all States Parties are able to benefit from the advances in science and technology without restriction.

## Annex II

### List of documents of the Meeting of Experts on Review of developments in the field of science and technology related to the Convention

<i>Symbol.</i>	<i>Title</i>
BWC/MSP/2018/MX.2/1	Provisional agenda for the Meeting of Experts on review of developments in the field of science and technology related to the Convention - Submitted by the Chair
BWC/MSP/2018/MX.2/2 English only	Background information document - Submitted by Implementation Support Unit (ISU)
BWC/MSP/2018/MX.2/3	Report of the Meeting of Experts on Review of developments in the field of science and technology related to the Convention
BWC/MSP/2018/MX.2/CRP.1 English only	Draft Report of the 2018 Meeting of Experts on review of developments in the field of science and technology related to the Convention - Submitted by the Chair
BWC/MSP/2018/MX.2/INF.1 English/French/Spanish only	List of participants
BWC/MSP/2018/MX.2/WP.1 English only	Germany's best practice in handling (bio)security-relevant research: Self-governance organized by the German National Academy of Sciences Leopoldina and the German Research Foundation (DFG) - Submitted by Germany
BWC/MSP/2018/MX.2/WP.2 English only	Technical Working Paper on Genome Editing and Other Scientific and Technological Developments of Relevance to the Convention - Submitted by Switzerland
BWC/MSP/2018/MX.2/WP.3 English only	Review of Developments in the Field of Science and Technology Related to the Convention - Genome editing - Submitted by Australia
BWC/MSP/2018/MX.2/WP.4 English only	Genome editing: addressing implications for the Biological and Toxin Weapons Convention - Submitted by the United Kingdom of Great Britain and Northern Ireland
BWC/MSP/2018/MX.2/WP.5 English only	Recent Advances in Gene Editing and Synthesis Technologies and their Implications - Submitted by the United States of America
BWC/MSP/2018/MX.2/WP.6 English only	Review of Developments in the Field of Science and Technology Related to the Convention - Genome Editing - Submitted by the Islamic Republic of Iran
BWC/MSP/2018/MX.2/WP.7 English only	Report of the Scientific Advisory Board of the Organisation for the Prohibition of Chemical Weapons on Developments in Science and Technology for the Fourth Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention - Note by the Implementation Support Unit
BWC/MSP/2018/MX.2/WP.8 English only	Response by the Director-General of the Organisation for the Prohibition of Chemical Weapons on the Report of the Scientific Advisory Board of the on Developments in Science and Technology for the Fourth Special Session of

<i>Symbol.</i>	<i>Title</i>
	the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention - Note by the Implementation Support Unit
BWC/MSP/2018/MX.2/WP.9 Chinese only	Proposal for the development of a model code of conduct for biological scientists under the Biological Weapons Convention - Submitted by China and Pakistan
BWC/MSP/2018/MX.2/WP.10 Spanish only	Códigos de Conducta en el Marco de la Convención de Armas Biológicas - Presentado por Cuba
BWC/MSP/2018/MX.2/WP.11 Spanish only	Nuevos adelantos de la Ciencia y la Tecnología en la Esfera de la Biología, en particular la Edición de Genes y la Biología Sintética - Presentado por Cuba
BWC/MSP/2018/MX.2/WP.12 English only	Review of Developments in the field of Science and Technology related to the Convention - Submitted by the Bolivarian Republic of Venezuela on behalf of the Non-Aligned Movement and other States Parties to the Biological and Toxin Weapons Convention