Updated 10 June 2016

Background paper

A STRUCTURED SCIENCE & TECHNOLOGY REVIEW PROCESS FOR THE BIOLOGICAL WEAPONS CONVENTION

Introduction

This paper provides an overview of relevant background material on good practice in addressing science and technology in policy settings, parameters and considerations for reviewing developments relevant to the BWC, models used in other fora, as well as proposals made so far for such a mechanism under this treaty. It is intended to provide sufficient details to enable an effective discussion of the topics covered and direct interested readers to more comprehensive sources.

This information is covered in the following sections:

- The Biological and Toxin Weapons Convention
- Good practice in addressing science & technology in policy settings
- Parameters and considerations for reviewing developments in S&T under the BWC
- Models used in other international for a
- Proposals for a BWC S&T review process

ANNEX - Principles suggested by Sir Peter Gluckman, Chief Science Advisor for New Zealand, to the 2014 INGSA Global Conference of Science Advice for Governments

The Biological and Toxin Weapons Convention

The Biological and Toxin Weapons Convention (BWC) enshrines norms against the weaponization of the life sciences and biotechnology and for the use for prophylactic, protective and other peaceful purposes. It is critical that it remains abreast of relevant developments in science and technology.

Such intent is found in Article XII of the treaty, which instructed the First Review Conference to consider such developments. All subsequent review conferences have reviewed relevant developments to the BWC. In part due to a growing awareness that five yearly reviews were too infrequent to keep pace with scientific progress, at the Seventh Review Conference (7RC) in 2011, BWC States Parties established a series of annual reviews of specific scientific and technological issues as part of its intersessional work programme.

The Eighth Review Conference (8RC), scheduled for November 2016, will consider these annual efforts and determine the modalities of future reviews. There have been calls for the 8RC to establish a more structured processes for reviewing developments in science and technology and considering their implications.

Current arrangements

States Parties to the BWC hold a high level meeting every five years to review the operation of the treaty. The heads of national delegations are formally authorised by their Head of State or Foreign Minister to make binding commitments on behalf of their country. Past review conferences have reached a series of additional agreements which provide more detailed provisions for translating the aims and objectives of the BWC into practical action. These meetings are the primary decision taking platform of the BWC and set the work programme prior to the next review conference.

Review conferences are mandated to consider relevant developments in science and technology. For example, the 7RC decided that the 8RC in 2016 would take into account "new scientific and technological developments relevant to the Convention, taking into account the relevant decision of this Conference regarding the review of developments in the field of science and technology related to the Convention".[1]

For the first time, the 7RC also established a series of annual reviews of on specific technical issues. Time was allocated during annual meetings of the BWC at both expert and State Party level to review:

- "New science and technology developments that have potential for uses contrary to the provisions of the Convention;
- New science and technology developments that have potential benefits for the Convention, including those of special relevance to disease surveillance, diagnosis and mitigation;
- Possible measures for strengthening national biological risk management, as appropriate, in research and development involving new science and technology developments of relevance to the Convention;
- Voluntary codes of conduct and other measures to encourage responsible conduct by scientists, academia and industry;
- Education and awareness-raising about risks and benefits of life sciences and biotechnology.
- Science- and technology-related developments relevant to the activities of multilateral organizations such as the WHO, OIE, FAO, IPPC and OPCW;
- Any other science and technology developments of relevance to the Convention."

Each year States Parties were to focus on a different scientific subject, namely:

- "Advances in enabling technologies, including high-throughput systems for sequencing, synthesizing and analyzing DNA; bioinformatics and computational tools; and systems biology (to be considered in 2012);
- Advances in technologies for surveillance, detection, diagnosis and mitigation of infectious diseases, and similar occurrences caused by toxins in humans, animals and plants (to be considered in 2013).
- Advances in the understanding of pathogenicity, virulence, toxicology, immunology and related issues (to be considered in 2014);
- Advances in production, dispersal and delivery technologies of biological agents and toxins (to be considered in 2015)".

The outcomes of those reviews can be found in the Reports of the annual Meeting of States Parties (MSP).[2]

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[1] BWC/CONF.VII/7. See: http://bit.ly/1MHg3g3

[2] See the Meetings and Documents section of the BWC website at: www.unog.ch/bwc

Good practice in addressing science & technology in policy settings

This section provides a summary of 3 reports which outline the way in which look at different aspects of the way science advice and science advisory mechanisms work.

<u>2014 INGSA Global Conference of Science Advice for Governments</u>

In August 2014, the International Council for Science (ICSU) and the Chief Science Advisor to the Prime Minister of New Zealand convened the inaugural Global Conference of Science Advice for Governments. A major resource for that conference was a Briefing Paper "Science Advice to Governments: Diverse systems, common challenges".[3]

That paper detailed some key issues in the provision of science advice, provided examples of science advice from different international organizations and parts of the world,[4] and details of three sets of principles currently used or proposed for the provision of science advice for policy making. The meetings was the start of a process to develop common international principles for science advice.

The paper highlighted diverse models and approaches to science advice, representing different political cultures, including:

- *Advisory councils* – high-level bodies for science policy, often comprised of senior scientists and representatives of industry, higher education and civil society. In many cases the "focus of such entities remain on policy advice in relation to the science system, which is distinct from science advice for public policy";
- *Advisory committees* – "specialised scientific and expert committees, which can address detailed technical and regulatory issues in areas such as health, environment, and food safety";
- *National academies, learned societies and networks* – national and international scientific bodies active in science policy or advice for science; and
- *Chief scientific advisors* – A growing number of countries appoint advisors specifically on science issues to a senior government figure, such as a president.

The report usefully distinguishes between "scientific evidence in policymaking ('science for policy')" and "a role in determining the budgets and structure of the research and innovation system ('policy for science')".

It also examines the duties of those participating in these processes noting:

> "Scientists are typically appointed as advisors or expert committee members because of their deep expertise and standing in a particular field of research, but (except in technical committees) they may only rarely be asked to provide advice that draws on their narrow area of expertise. More often, their role is to act as intermediaries, able to translate, aggregate and synthesize varied perspectives and sources of evidence."

[3] http://bit.ly/1VoOXOb

[4] These included Australia, Canada, China, Cuba, El Salvador, Finland, France, Germany, India, Italy, Japan, Mongolia, New South Wales (Australia), New Zealand, Quebec (Canada), Republic of Korea, Switzerland, South Africa, Taiwan (China), United Kingdom, UN Scientific Advisory Board, International Council for Science: Science for Policy; and Future Earth.

More broadly, those providing science advice should "look beyond the scientific content of a particular issue and communicate the broader methodological principles and concepts that underpin scientific evidence".

The report acknowledges that neither science nor policy operate in a vacuum and that:

> "Any issue where science is an important factor, but where values, ethics and politics are also in tension, is unlikely to be resolved through a simple statement of the scientific evidence. To assume a linear relationship between evidence and policymaking is often a mistake, and advisors need to recognize the many ways in which evidence, values and political judgments combine to produce decisions."

It also examines the role other experts can play in this process, noting that "identifying solutions to cross-cutting policy problems will require input not only from natural scientists, but also from engineers, social scientists and other experts". The report highlighted the growing body of evidence supporting good practice in the provision and integration of science advice.

Attached to the report was a series of principles suggested by Sir Peter Gluckman, in his role as Chief Science Advisor for New Zealand and co-convenor of the meeting (see Annex).

OCED report on Scientific Advice for Policy Making: The Role and Responsibility of Expert Bodies and Individual Scientists

This report, published by the OECD in 2015, provides an overview of the current landscape of science advice for policy-making, addresses similar themes to the INGSA global conference, noting:

> "The scientific community is increasingly being called upon to provide evidence and advice to government policy-makers across a range of issues, from short-term public health emergencies through to longer-term challenges, such as population ageing or climate change. Such advice can be a valuable, or even essential, input to sound policy-making but its impact depends on how it is formulated and communicated as well as how it is perceived by its target policy audience and by other interested parties. It is rare that scientific evidence is the only consideration in a policy decision and, particularly for complex issues; many interests may have to be balanced in situations where the science itself may be uncertain."[5]

The OECD report included a checklist science advice asserting that "an effective and trustworthy science advisory process needs to:

1. *Have a clear remit, with defined roles and responsibilities for its various actors*.
   This includes having:
   - A clear definition and, insofar as is possible, a clear demarcation of advisory versus decision-making functions and roles
   - Defined roles and responsibilities and the necessary expertise for communication
   - An ex ante definition of the legal role and potential liability for all individuals and institutions that are involved
   - The necessary institutional, logistical and personnel support relative to its remit.

[5] http://www.oecd.org/science/sci-tech/science-advice.htm

2. *Involve the relevant actors – scientists, policy-makers and other stakeholders, as necessary*. This includes:
   - Using a transparent process for participation and following strict procedures for declaring, verifying and dealing with conflicts of interest
   - Engaging all the necessary scientific expertise across disciplines to address the issue at hand
   - Giving explicit consideration to whether and how to engage non-scientific experts and/or civil society stakeholders in framing and/or generating the advice
   - Having, as necessary, effective procedures for timely exchange of information and co-ordination with different national and international counterparts.
3. *Produce advice that is sound, unbiased and legitimate*. Such advice should:
   - Be based on the best available scientific evidence
   - Explicitly assess and communicate scientific uncertainties
   - Be preserved from political (and other vested-interest group) interference
   - Be generated and used in a transparent and accountable manner".

The report also highlighted a growing interest from civil society in science advice, noting "openness, integrity, transparency and accountability are the critical terms in modern day science advisory structures. Increasingly scientific expertise is being complemented by lay experts on advisory panels; policy questions are being framed in multi-stakeholder settings and policy decisions – even on 'scientific issues' are being made in consultation with multiple interested parties".

EU SPIRAL project handbook on effective interfaces between science, policy and society

The European Union's 7th Framework Programme activity on Science-Policy Interfaces: Research, Action and Learning (SPIRAL) carried out research on science-policy interfaces and communication, and contributed to the design, implementation and improvement of real-life Science-Policy Interfaces (SPIs). SPIs are structures and arrangements "to establish appropriate connections between the diverse insights and perspectives of scientists and other knowledge holders, and the needs and interests of decision-takers, implementers and other knowledge users".

One of the products produced was the Handbook on Effective Interfaces between Science, Policy and Society.[6] The Handbook identified 8 tips for establishing and running SPIs:

1. *Clarify why SPIs are needed* – "all too often, developing a SPI is seen as ticking the box in terms of communicating research: no real thought goes into why SPIs are developed and how they can help with the real impacts of research. It is important, therefore, as early as the proposal development stage, to spend time with colleagues and start making new links in science and/or policy to clarify whether SPIs are actually needed in the first place, or whether other activities might be sufficient";

[6] http://www.spiral-project.eu/sites/default/files/The-SPIRAL-handbook-website.pdf

2. *Clarify what the SPI can and cannot do* – "this can help avoid frustration, for example from colleagues who may want more out of the SPI. One way is to think of the wider benefits of the SPI for the project, individuals in the project, and the project stakeholders. This can help motivate those working in the SPI. For example, the SPI may build understanding and trust with others";

3. *Know who will form the SPI* – "SPIs are very much about the people involved in them. It is therefore important to start making those links with policy and science at the project proposal stage. Personalities are important here – the right 'expert' may not always be the best communicator, which may affect the SPI in the long run. Investing a little time trying to know people that may become involved in the SPI can help in the long-term";

4. *Keep people in the project motivated* – "time spent on SPIs can be perceived as time taken from other activities. A possible way forward is to determine and communicate how the individuals involved in SPIs can benefit from this involvement. Early on in a project, this can involve, for example, writing a review article – this academic output (which is often highly cited) also benefits policy by compacting into a short document current state of knowledge about the topic being considered";

5. *Be flexible if possible* – "all too often, a SPI strategy is developed and participants cannot, or do not want to, budge from original plans. It may be, however, that there is a particular policy need that could be addressed by the project, but which needs a rethink of the work plan. If possible, building in some flexibility into project work plans will help the effectiveness of SPIs…. Such an approach requires flexibility from the funding agencies too";

6. *Be ready to compromise* – "a SPI will never please everyone all the time – there is bound to be some level of compromise and trade-off. However, if good relationships have been developed among those in the SPI, this can increase the likelihood of being able to discuss the best possible compromises";

7. *Learn from past mistakes and successes* – "there is often a lack of institutional memory when it comes to SPIs. As individuals and project participants we can all learn from past and current SPIs. Review or monitoring mechanisms can also help identify what works and what does not work so well, so that SPIs can continue to be improved"; and

8. *Accept it takes time and resources but is worth it* – "developing a SPI can take time: time developing relationships, time developing new skills, time listening to others. This is often time we believe we do not readily have. Most efforts, however, can pay off not only during the project but also after the end of the project and can ensure greater impact from project results. Similarly SPIs need to be allocated sufficient resources to be viable and effective".

The project also identified 5 possible pitfalls for SPIs, including:

- *Unclear or poorly thought-through SPIs* – this commonly includes investing insufficient time and resources in understanding the policy and societal context resulting in poorly adapted SPIs. In other cases the challenge is developing scientific objectives that match the needs of policy. Other problems have arisen from there being little incentive for science or policy to interact, resulting in serious differences in expectations.

- *Power influences* – "SPIs are messy processes where different values operate and power games and influences will necessarily happen. It may be that scientific outputs interfere with policy interests, leading to a bias in policy makers only acknowledging results that fit their current or proposed arguments or policies". Furthermore, "many SPIs are constrained by conflicts between different stakeholders, not only in science and policy. This may be due to poor involvement of sectors other than science". Restricted participation in SPIs "an lead to disenfranchised stakeholders and ultimately the poor implementation of decisions";

- *The media* – "interactions with the media are often still perceived by actors in science and policy- making as risky. Better understanding how the media works, training and involving journalists, and understanding how best to work with the media may promote indirect communication into policy";
- *The role of key individuals* – "An SPI can be strongly dependent on the involvement of individuals committing their time and energy but also potentially influencing it. When or if these individuals leave, there is a risk that effort/interest in the SPI may dwindle. Possible ways of avoiding this are to keep these individuals on board, training up replacements, and broadening the number of such individuals to build on teams rather than individuals"; and
- *Lack of resources* – "Many of the above factors are due to insufficient money and time being dedicated to SPI activities".

Parameters and considerations for reviewing developments in S&T under the BWC

The BWC: Implications of advances in science and technology

To assist States Parties at the 8RC, the IAP: Global Network of Science Academies, in collaboration with the Polish Academies of Sciences, the UK's Royal Society, and the US National Academy of Sciences, convened a meeting to consider trends in science and technology relevant to the BWC.[7]

One of the issues considered during this meeting was the process used under the BWC to review such developments. The meeting found that there was "a pressing need for effective, on-going, and suitably resourced arrangements to:

- Formulate specific questions that can be answered by reviewing developments in science and technology;
- Identify current scientific and technical capabilities pertinent to these questions;
- Consider the implications of those development in the context of the BWC; and
- Take decisions or actions necessitated by those developments".

The meeting also identified a number of characteristics desirable in a review process, regardless of format, including that it be:

- "Flexible – able to adjust to changing needs and priorities;
- Inclusive – able to take advantage of expertise, wherever it is to be found;
- Agile – able to adjust quickly to seize all available opportunities;

[7] https://royalsociety.org/~/media/policy/projects/biological-toxin-weapons-convention/bwc-trends-booklet.pdf

- Responsive – able to actually change when needed;
- Able to foster greater engagement – actively encouraging and enabling contributions from the widest possible set of stakeholders; and
- Transparent – ensuring the widest possible group of stakeholders benefit from its work".

<u>2015 BWC Meeting of Experts</u>

Two States Parties submitted Working Papers to this meeting addressing processes for reviewing developments in science and technology relevant to the BWC. Switzerland's paper was intended to foster a debate on what an effective science and technology review process for the BWC might look like thereby aiding preparations for the 8RC.[8] Switzerland discussed the need for a more robust review and the value it might add to efforts under the BWC. The paper detailed a series of parameters and considerations for a dedicated review process, such as:

- "Process, including how often the group meets, how it is connected to the relevant policy process, how its members are elected or nominated, whom are they representing when they participate, and how is the issue of appropriate geographic representation dealt with?
- Scope, including does the group primarily focus on identifying developments or considering their implications, who decides what it covers, and are any issues specifically excluded from its work?
- Costs, including the annual budget, are participation costs covered (and if so, by whom), is there a sponsorship programme, and what languages are used by the group/are meetings conducted in a single language to reduce interpretation and translation costs?
- Guidance and coordination, including who provides oversight of the group, who chairs it and where does the administrative support come from, and who, if anyone, speaks on behalf of the group?
- Input, including how external expertise is accessed, what limits are there on where input comes from, and what role do international and non-governmental organizations play? and
- Reporting, including does the group report directly to States Parties, or through another channel and to what end, can they make recommendations, is the report factual or based on expert opinion, consensus-based or captures differing views, exhaustive or consolidated, intended for a technical or policy audience?"

The Islamic Republic of Iran submitted a paper to this meeting focusing on linkages between reviewing developments in science and technology and Article X of the BWC which addresses the use of biological agents for prophylactic, protective and other peaceful purposes.[9] They argued that one of the benefits of effectively reviewing developments in science and technology and considering their implications to the BWC was to assist in "capacity building, technical knowledge sharing and training, bearing in mind that States Parties have undertaken to facilitate and have the right to participate in the fullest possible exchange of equipment, materials and scientific and technological

[8] BWC/MSP/2015/MX/WP.11. See: http://bit.ly/1TXx7SY

[9] BWC/MSP/2015/MX/WP.15. See: http://bit.ly/1SarPAd

information for the use of biological agents and toxins for peaceful purposes including for medicines, vaccines and diagnostic production and procurement”.

The paper highlighted progress being made in “prevention, mitigation, control, care and treatment of emerging and re-emerging communicable diseases as well as local production of necessary medicines, vaccines, biologics and diagnostics especially considering diversity of such pathogens for specific regions of the world”. It reviewed relevant developments in the context of the Ebola Virus Disease epidemic in West Africa.

The Islamic Republic of Iran emphasised “that the new developments in the field of science and technology related to the Convention shall, in no way, be the pretext to impose any trade limitations (sanctions) or hamper the economic or technological development of the States Parties or international cooperation in the field of peaceful bacteriological (biological) activities, including the international exchange of bacteriological (biological) agents and toxins for peaceful purposes”.

The paper called upon the 8RC to “thoroughly deliberate and take necessary effective action on the development of science and technology and in its relation with Article X implementation henceforth, to increase the capacity-building of States Parties in biological activities such as medicines, vaccines and diagnostics production”.

2015 BWC Meeting of States Parties

The United States submitted a working paper to this meeting focusing more broadly on how the next BWC intersessional work programme might be improved to enable effective action to be taken.[10] One element addressed in this paper was to improve capacity for in-depth substantive and technical discussions. The paper argued “the current intersessional process tries to do too much in too little time. It does not provide opportunities for in-depth discussion of key issues by technical experts, and progress is, therefore, limited”. In order to address this shortcoming and to “improve capacity for in-depth substantive and technical discussions, the Review Conference should take action to replace the annual Meeting of Experts with dedicated, expert-led processes”, including to “assess and respond to developments in science and technology, including through oversight, outreach, and education”.

April 2016 Preparatory Committee meeting (moved from alter in the document after the PrepCom)

The United States provided a working paper that detailed four features that they consider essential to any science advisory structure without binding this a specific structure.[11] These features are that it:

- Be responsive to needs of States Parties, in particular provide outputs that are clear and in plain language, offer technical support to State Parties and be nimble – possibly annually agreed products.
- Have necessary technical expertise, States Parties nominate experts to serve in personal capacities, needs to be interdisciplinary.

[10] BWC/MSP/2015/WP.3. See: http://bit.ly/1RtTJUE

[11] BWC/CONF.VIII/PC/WP.3. See: http://bit.ly/25Ro7lm

- Be representative of the diversity of all States Parties, its composition should be geographically diverse and representative of all States Parties. Possible voluntary fund or a line item in the ISU budget to ensure broad cross-regional.
- Be structured for success, needs staff support, could report to the Chair of the BWC. States Parties nominate 1-2 experts, observers and invited experts by Chair. Only have one annual in person meeting – the rest online.

Models used in other international fora

In advance of the 2015 BWC MSP, Biosecure was commissioned by Switzerland to survey the mechanisms used in other relevant fora to review developments in science and technology and consider their implications. Details of the parameters previously identified by Switzerland (process, scope, costs, etc.) were compiled and the results of the review were annexed to a Working Paper submitted to the MSP.[12]

The survey covered:

1. Other disarmament processes that have to deal with technical developments, such as:
   - The Group of Governmental Experts of the High Contracting Parties to the Convention on Certain Conventional Weapons (CCW GGE) and its Meetings of Military and Technical Experts (CCW MMTE);
   - The Scientific Advisory Board of the Organization for the Prohibition of Chemical Weapons (OPCW SAB) and its Temporary Working Groups (OPCW TWG); and
   - The United Nations Group of Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security (UN GGE).
2. Non-disarmament-related international policy processes that contend with developments in the life sciences, such as:
   - The Subsidiary Body on Scientific, Technical and Technological Advice of the Convention on Biological Diversity (CBD STTA) and its Ad Hoc Technical Expert Groups (CBD AHTEG);
   - The EU science advisory mechanism (EU SAM);
   - The International Panel on Climate Change (IPCC);
   - The Specialist Commissions of the World Organization for Animal Health (OIE SC) and its Ad Hoc Groups of Experts (OIE AHG);
   - The Subsidiary Body for Scientific and Technological Advice of the United Nations Framework Convention on Climate Change (UNFCCC STA), and its Structured Expert Dialogue (UNFCCC SED);
   - The Scientific and Technical Partnership of the United Nations Office for Disaster Risk Reduction (UNISDR STP) an its Scientific and Technical Advisory Group (UNISDR STAG);

[12] BWC/MSP/2105/WP.10. See: http://bit.ly/1UHRYIN

- The United Nations Secretary-General's Scientific Advisory Board for sustainable development (UNSG SAB); as well as
- Advisory committees convened by the World Health Organization (WHO AC).

Swiss analysis of this survey concluded:

- *Process* – Most other processes met once or twice a year. More frequent and infrequent examples did exist and some processes convened on demand. Having noted differences in the mandates and scope of different process, many processes met for more time than previously dedicated under the BWC, perhaps between 5 and 18 days per year. Some processes supplemented face-to-face meeting time with remote working practices. There were also clear demarcations between technical and policy processes in many other fora. The composition of the processes included participants representing States or organizations, contributing in an individual capacity, and combined process where are limited number of states are selected and they then nominate an individual expert to take part. Some processes were open-ended, others had restricted membership – in such cases specific terms ensuring gender balance and geographic representation were common in the respective mandates.
- *Scope* – most processes both reviewed developments and considered their implications. Few specific limitations of the work of the processes were identified but a number of different approaches for determining what would be covered were found, including: the political body takes decisions in advance; the group undertaking the review develop their own plans but submit them for approval to the policy body; the policy body determines a general direction of the review but the expert body determines the specific details; the policy body identifies a topic for review, the export body develops a plan, which is then submitted back to the policy body for review; and in cases where an expert body report to an individual (such as a Director-General) they either task the expert group, or suggest topics to address;
- *Costs* – Precise costs were difficult to obtain as they were commonly integrated into a larger budget. Large scale international consultations were expensive – $6-15m. Open-ended international discussions cost $700,000-$1.3m. Limited membership scientific advisory boards cost $40-45,000. In some cases, core costs are included in a general budget and voluntary contributions expand the work of the group. In kind and sponsorship contributions from international organizations and states were also used on occasion. Sponsorship for participation of experts from developing countries was common, honoraria or other payments on top of expenses were not. Instantaneous interpretation into all the UN languages is common in formal meetings but there are examples of working languages being adopted to limit expense. Subsidiary bodes, and temporary working groups commonly adopt a working language.
- *Guidance and coordination* – In some of the examples examined, oversight is provided by a board or bureau. In other examples, it is provided by an individual (such as a President of a meeting, or a Special Representative. The chair of the process was sometimes nominated by states, sometimes rotated through regional groups, or elected from within the expert group. There were examples of such groups being chaired by representatives from international organizations or NGOs. The amount of support provided by associated international organizations or institutions varies depending on their size and existing resources. There were numerous examples of dedicated resources being made available to provide support for science and technology review processes.

- *Input* – In many cases international organizations participate as observers, sometimes delegating formal focal points. There were examples of them having full membership, being invited to informal briefings, and nominating individual representatives. Different models were found for contributions from experts outside of states and international organizations. In some cases, no such experts were able to participate. In other cases, NGOs were able to participate in their own right. Sometimes individual experts were invited to participate given their specific expertise. Many fora allowed external experts to be members, others restricted such membership to sub-groups.
- *Reporting* – Most of the fora reviewed reported to a relevant policy body. Most of those reports are consensus-based and policy-focused and consolidated a wider range of input. Examples of reports for technical audiences were identified but summaries for policy makers were produced in such cases. In almost all processes reviewed the reports did include recommendations or advice.

Proposals for a BWC S&T review process

A number of concrete proposals for science and technology review processes under the BWC have been made to date, including by India in 2011, Australia, Japan and New Zealand in 2011, and Ukraine in 2013.

<u>Proposal by India</u>

In advance to the 7RC, India called for a "structured and systematic review of S&T developments within the framework of the Convention".[13] They proposed to:

1. "Review new scientific and technological developments of relevance to the Convention:
   - Identify developments which could have a potential for uses contrary to the provisions of the Convention;
   - Identify developments which are of particular concern with respect to bioterrorism;
2. Review new Science & Technological developments of special relevance to disease surveillance, diagnosis and treatment of pandemics:
   - Identify science and technological developments which would be of particular benefit to developing countries;
3. Identify emerging risks in dual use research and development involving new S&T developments of relevance to the Convention:
   - Examine voluntary Codes of Conduct inter alia for scientists, academia and industry in fields relevant to the Convention;
   - Identify communication strategies about risks and benefits of life sciences and biotechnology;
4. Review S&T related developments in other multilateral organizations such as WHO, OIE, FAO and IPPC which are of relevance to the Convention".

[13] BWC/CONF.VII/WP.3. See the Meetings and Documents section of the BWC website at: www.unog.ch/bwc

Several of these areas were reflected in the mandate of the review process created by the 7RC. The structure proposed by India was that adopted in 2011 – with a specific agenda item being added to Meetings of Experts and MSP. The Indian proposal contained several additional elements that were not reflected in the decision of the 7RC, including:

- "Reports of such meetings containing review of S&T developments, assessment of their implications to the Convention and recommendations could be discussed and forwarded by the Meeting of State Parties to the next Review Conference, which shall consider such reports in accordance with Article XII of the Convention and take appropriate decisions"; and
- "The Meeting of Experts may be structured so as to facilitate the broadest possible contribution of industry, academia and the scientific community".

<u>Proposal be Australia, Japan and New Zealand</u>

Australia, Japan and New Zealand submitted a working paper to the 7RC that detailed why a new annual science and technology review process was necessary.[14] This paper included a proposal to create a Science and Technology Working Group. Each year:

- "The MSP would identify one or more topics to be reviewed in the following year and "invite independent international scientific organisations (ISOs), including IAP, to prepare factual reviews of topic(s), with input from national academies of science and scientific unions in the life sciences;
- The MSP would invite independent international scientific organisations (ISOs), including IAP, to prepare factual reviews of topic(s), with input from national academies of science and scientific unions in the life sciences.
- ISO representatives would discuss their factual reviews of topic(s) with States Parties during sessions of the S&T Working Group at the subsequent Meeting of Experts held in August.
- States Parties at the S&T Working Group sessions would then consider implications for the BWC of the advances in the topic(s). The S&T Working Group Facilitator, appointed by the States Parties for the duration of the 2012-2015 intersessional period, would prepare a report, reflecting the factual reviews and the views of States Parties' experts but not necessarily consensus.
- The S&T Working Group Facilitator's Report would be circulated prior to the subsequent MSP to allow States Parties to consider any actions required. Actions taken by the MSP relevant to the implementation and operation of the BWC arising from the S&T Working Group would be subject to review at the subsequent Review Conference. The cycle would then recommence, with the MSP developing particular S&T topic(s) to be reviewed in the following year".

The paper also suggested that the working group could also "provide a means to address other S&T issues relevant to the BWC, including education/awareness-raising within the broader scientific community".

[14] BWC/CONF.VII/WP.13. See the Meetings and Documents section of the BWC website at: www.unog.ch/bwc

Proposal by Ukraine

At the 2013 Meeting of Experts, Ukraine noted shortcoming in existing arrangements and proposed that at the 8RC "States Parties should consider creating, instead of a scientific advisory board, an open-ended working group to examine and report on the implications for the Biological Weapons Convention of the rapid advances in the life sciences, including the convergence of chemistry and biology".[15]

Proposal by the Russian Federation

At the April 2016 PrepCom, the Russian Federation proposed a Science Advisory Committee (SAC) as a special subsidiary organ with one annual meeting covered by States Parties.[16] The ISU would be mandated to hold a fund for such a process and provide the necessary support. The role of the SAC would be to conduct reviews of science and technology and report to State Parties. It would be comprised of 25 members, nominated by States Parties, allocated across the three 3 regional groups (the Group of the Non-Aligned Movement and Other States, the Western European Group, and Eastern European Group. Members of the SAC would serve in an individual capacity, based upon their expertise. The SAC would be mandated to create temporary working groups that would be chaired by a member of SAC and address specific issues. The SAC would report to State Parties, reflecting consensus views and on the progress of any working groups.

Proposal by the United Kingdom

Proposes a one week meeting in the spring of government technical experts make consensus proposals to the Annual Meeting of State Parties.[17] Can be tasked by the Annual Meeting of the BWC, and sets its own agenda, with the ability to invite experts when required. It will submit technical reports and be chaired by a scientific expert nominated and agreed, by States Parties. The group will be supported by scientific officer at ISU and the ISU to establish an electronic system between the experts.

Proposal by Finland, Norway and Sweden (added after the April PrepCom)

Finland, Norway and Sweden proposed that dedicated meetings of scientific experts were needed for continuously evaluating developments in the life sciences and biotechnology. Such meetings would address specific topics and develop concrete recommendations to States Parties.[18] The current MX would be adapted by setting annual science and technology topics at the preceding MSP. States Parties would nominate national experts, possessing know-how on the specific topics to be considered, who would serve as members of a more structured scientific open-ended group. The ISU would support the work of the group and act as a Rapporteur. Experts from academia, civil society and industry would be invited, as required, to participate in an individual capacity. There was also a call to explore mechanisms to enable participation of experts from different parts of the world.

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[15] Report of the Meeting of Experts, BWC/MSP/2013/MX/3. See the Meetings and Documents section of the BWC website at: www.unog.ch/bwc

[16] BWC/CONF.VIII/PC/WP.2/Rev.1. See: http://bit.ly/1XL2NwV

[17] BWC/CONF.VIII/PC/WP.4. See: http://bit.ly/1XdU6dH

[18] BWC/CONF.VIII/PC/WP.7. See: http://bit.ly/1UajU7h

ANNEX

Principles suggested by Sir Peter Gluckman, Chief Science Advisor for New Zealand, to the 2014 INGSA Global Conference of Science Advice for Governments

Maintain the trust of many. The science adviser must sustain in parallel the trust of the public, the media, policy-makers, politicians and the science community. This is especially true in times of crisis and is no small challenge.

Protect the independence of advice. The advisory role should be structured so as to protect its independence from both political interference and premature filtering in the policy process. There is inevitably a tension between such independent advice and departmental policy processes, and it takes considerable diplomacy to create a trusted partnership between an external adviser and departmental officials.

Report to the top. Scientific advice must be available directly — uncensored — to the head of government or the head of the relevant department. Indeed, the questions for which advice is most often sought tend to be politically sensitive and cut across individual portfolios.

Distinguish science for policy from policy for science. Science advising is distinct from the role of administering the system of public funding for science. There is potential for perceived conflict of interest and consequent loss of influence if the science adviser has both roles. There is a risk that the adviser comes to be perceived as a lobbyist for resources, or that the role becomes restricted to the ministry that manages the national research funding. Yes, a science adviser should have input into science policy, but there is a delicate balance to strike.

Expect to inform policy, not make it. Science advice is about presenting a rigorous analysis of what we do and do not know. Alone, it does not make policy. There are many other appropriate inputs to policy, including fiscal considerations and public opinion. Policy-makers and elected officials rightly guard their responsibility to define policy — and this means choosing between options with different trade-offs. This is not the domain of a science adviser. Being explicit about this has eased my capacity to establish and sustain trust broadly across government and the policy community.

Give science privilege as an input into policy. While acknowledging the other relevant inputs into policy formation, we need to demonstrate why science should hold a privileged place among the 'types of knowledge' that may be meaningful to a politician. These include social tradition and popular belief. The privilege of science-derived knowledge comes from its set of standard procedures — for example, replication and peer review — that limit the influence of beliefs and dogma. The other inputs into policy are value-intensive, and rightly so.

Recognize the limits of science. Science can increasingly address complex questions over which policy-makers and elected officials agonize. But scientists must not overstate what is or can be known, even though the shift from a view of science as a source of certainty to a source of probability can frustrate and confuse decision-makers and the public. How many politicians or issues advocates have claimed that they can find a scientist to back any position as, indeed, at least one did in the folate debate? This attitude reflects the dangerous temptation to use science to justify value-based beliefs and a lack of literacy about what science is (a process)7. For example, much of the debate about climate change is not primarily about the data. Rather, it is about intergenerational economic interests.

Act as a broker not an advocate. Trust can be earned and maintained only if the science adviser or advisory committee acts as a knowledge broker, rather than as an advocate6 — often a subtle distinction. When formal science advice is perceived as advocacy, trust in that advice and in the adviser is undermined, even if the advice is accepted. For example, exaggerated presentations about the causes of storms and floods can erode the credibility of the underlying argument about global warming.

Engage the scientific community. The science adviser must know how to reach out to scientists for the appropriate expertise, and help them to enact their social responsibility in making their knowledge accessible and understandable, and in being more self-aware about when they might be acting as advocates. These issues are encapsulated in the recently updated, groundbreaking Code of Conduct for Scientists8, which directly implies a distinction between brokerage and advocacy, published by the Japanese Council of Science.

Engage the policy community. The role of the science adviser is often less about providing direct technical expertise than it is about nudging attitudes and practices to enhance both the demand for and the supply of evidence for public policy.
