
**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**

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Item 10(b) of the provisional agenda

**Review of the operation of the Convention as
provided for in its Article XII****Articles I-XV**

**Facilitating the fullest possible exchange of science and
technology under Article X**

Submitted by the United States of America

1. The United States places great importance on cooperation and assistance under Article X “to facilitate ... the fullest possible exchange of equipment, materials, and scientific and technological information for the use of ... biological agents and toxins for peaceful purposes.” This commitment is illustrated by activities described in the reports submitted by the United States on U.S. implementation of Article X,¹ although the breadth and scope of U.S. contributions and assistance preclude a comprehensive listing of each and every program.

2. One of the most visible indicators of the U.S. commitment to Article X is the variety of international exchange programs for scientific research funded by various U.S. Government departments and organizations, including the National Institutes of Health, the Department of Agriculture, and the Food and Drug Administration. Such international collaboration enhances the quality of research and allows scientists to work with people and institutions that complement their work, wherever they are located.

Additional Avenues for International Cooperation under Article X

3. Not all U.S. activities and programs that promote exchange, cooperation, and assistance are undertaken by the United States Government, they are also undertaken by individuals, industry, foundations, universities, and other non-governmental organizations. Partnerships with these other actors are essential to facilitate the fullest possible exchange and to enhance a State Party’s biotechnology capacity. They play a critical role in

¹ BWC/CONF.VIII/INF.4; BWC/MSP/2014/MX/INF.5; BWC/MSP/2012/MX/INF.5. ²
BWC/CONF.VII/7.

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international cooperation under Article X, as noted in the Final Document of the 7th Review Conference.²

4. From cutting-edge academic institutes, to industrial and government research centers, to independent laboratories, to “do it yourself” community spaces, progress in life science research is increasingly driven by innovation and open access to the insights and materials needed to advance specific initiatives. In 2013, U.S. industry, academia, and government funding contributed \$456.1 billion to scientific and engineering research and development efforts, out of \$1.671 trillion worldwide. The largest performing sector of this research and development was the business sector, which conducted 71% of the U.S. total. Academia was the second-largest sector: universities and colleges conducted \$64.7 billion, or 14%, of U.S. R&D in 2013. In comparison, the \$49.9 billion, or 11%, of research and development performed by federally funded research centers and agency intramural laboratories, is quite small in relative terms, demonstrating the extent to which scientific R&D occurs outside of the government sector and how beneficial engagement with these communities can be.³

5. One of the more important avenues for promoting exchange, cooperation, and even assistance is through the training of students from other countries. In the 2014-2015 academic year, more than 974,000 students from other countries were enrolled in U.S. colleges and universities. Forty-four percent of these were studying science, technology, engineering and mathematics subjects, and 8%, or nearly 78,000, were studying physical or life sciences. At the postgraduate level, 13,739 doctorates in science and engineering were awarded to temporary visa holders in 2014, a 42% increase since 2004. Temporary visa holders represented 37% of all recipients of science and engineering doctorates.⁴ In addition, thirty-three percent of academic science and engineering publications with authors based at U.S. institutions were co-authored with institutions in other countries in 2013, compared with 19% in 2000. A growing number of major U.S. institutions are also making undergraduate and even some graduate courses freely available online. Yale University, the Massachusetts Institute of Technology, Stanford University, and the Johns Hopkins Bloomberg School of Public Health are among the U.S. universities providing free and open access to a variety of courses through their own websites or through online platforms such as Coursera or edX.

6. Engagement with the private sector is also an important avenue. The biopharmaceutical industry is one of the most research-intensive industries in the United States, and its significant investments in R&D result in major contributions to the economy. Companies in the industry have invested more than half a trillion dollars in R&D over the past 15 years.⁵ Foreign direct investment by private corporations can be a major driver for technology transfer, as well as a powerful engine of economic growth. While corporations may have a variety of reasons for engaging in foreign direct investment, their decisions will usually take into account the profitability and future success of any investment. Therefore, the policy and regulatory decisions of States Parties exert tremendous influence on these investment decisions and can support and encourage opportunities for engagement with the private sector.

² BWC/CONF.VII/7.

³ National Science Board, Science and Engineering Indicators 2016 Report, www.nsf.gov/statistics/2016/nsb20161.

⁴ National Center for Science and Engineering Statistics Directorate for Social, Behavioral and Economic Sciences, “Doctorate Recipients from U.S. Universities 2014,” National Science Foundation, <https://www.nsf.gov/statistics/2016/nsf16300/digest/nsf16300.pdf>.

⁵ PhRMA 2016 Biopharmaceutical Research Industry Profile, <http://www.phrma.org/sites/default/files/pdf/biopharmaceutical-industry-profile.pdf>.

Practical Measures to Encourage Partnerships with the Private Sector

7. The United States remains committed to fulfilling its Article X commitment “to facilitate “...the fullest possible exchange of equipment, materials, and scientific and technological information” related to the use of biological agents and toxins for peaceful purposes. However, such exchanges cannot be imposed by one country upon another, or by a country’s government upon its private sector. In particular, States Parties’ Governments cannot and should not compel the private sector to transfer its technology. Exchange cannot be compelled, but neither is it passive; it requires cooperation from both parties. Therefore, State Parties can and should explore steps they can take to encourage the private sector to share its advances and to carry out research in their countries by building an environment conducive to such exchanges, including encouraging foreign direct investment. Thus far, however, the practical measures that States Parties can take to encourage investment and technology transfer have gone largely unaddressed in discussions of Article X. This paper seeks to identify some steps that States Parties can take to create an environment conducive to further cooperation.

Create innovation-friendly political environments with sound intellectual property rights and associated regulations

8. Recognized, effective, and predictable intellectual property regulations provide an important incentive for investments in innovation and facilitate exports around the world. They enable innovative ideas and technologies to become marketable and profitable, and allow collaboration while protecting the rights of the original inventor. Industry may be reluctant to engage with certain countries if companies have to undertake activities designed to protect against unlicensed imitation of their products, which would incur additional costs. Moreover, operating in regulatory environments that are uncertain or are not consistent with international norms can also increase costs. Strengthening intellectual property regulations and harmonizing them can diminish costs to industry, which often leads to increased foreign direct investment in, and international technology transfer to, host countries.

Develop a skilled workforce, invest in educational infrastructure, and support research in universities and research institutes

9. Education policies that are designed to develop and sustain a skilled workforce can play a direct role in attracting foreign direct investment. A continuing supply of educated and technically proficient workers who can receive, sustain, and translate the knowledge and technology from private-sector investment is a critical element in supporting a biotechnology industry. Supporting national and academic research institutes, ensuring access to high-quality science education at every grade level from primary to university and postgraduate programs, and providing incentives to attract private sector investment in education are all policy initiatives that States Parties can take to increase foreign direct investment.

Promote regulations, laws, and policies on commercial activities and competition that are robust, transparent, and encourage foreign investment

10. Biotechnological research and development is a long-term prospect. Companies invest in creating products and health solutions that may take many years and millions of dollars to bring to fruition. This type of foreign direct investment is adversely affected by volatile markets and political instability. Predictable and robust legal and regulatory regimes are critical to promote innovation and minimize investment risk. By recognizing the private sector’s need for transparent market structures and stable political systems, States Parties can promote laws and regulations to foster innovation and minimize investment risk for industry.

Support markets which are open to trade and foreign direct investment

11. Providing easy market access and eliminating undue regulatory barriers for international companies can be critical activities for countries looking to attract investment or technology transfer from such companies. Equitable regulations and standards for both national and international firms, and products imported or manufactured locally, can encourage foreign direct investment. Investment opportunities also emerge from markets where there is already local demand or where specific health needs have been identified. States Parties can provide incentives to encourage technology transfer by ensuring their regulations support open, equal market transactions and partnering with companies to fulfill local product demand and build capacities to solve national health problems.

Looking to the Future

12. As a 2015 report commissioned by the Biotechnology Innovation Organization (BIO), which represents more than 1,100 companies, universities, research institutions, investors, and other entities in more than 32 countries, notes, “Designing an environment that is conducive to the innovation, research, commercialization and marketing of biotechnological products and technologies is not an exact science. There are a myriad of factors that potentially can affect, encourage or discourage rates of biotech innovation.”⁶ Nevertheless, it is possible to identify certain policies that States Parties can adopt that will make it easier to attract foreign direct investment and develop a national biotechnology sector.

13. A growing number of emerging economies are making the development of their biotechnology industries a national priority, and have announced national strategies to develop key technologies and advance innovation. Such strategies can be of vital importance in helping countries define the role of biotechnology in their national interests; identify short- and long-term goals; and make policy commitments. While these strategies are in various stages of implementation, the experiences of countries that have designed and implemented them thus far suggest that the process of developing national strategies can help States Parties improve coordination among various government agencies and identify weaknesses in their national regulatory systems. These strategies can then identify practical policy measures that can help to address those weaknesses and attract additional foreign direct investment.

14. Innovations in biotechnology and global health solutions are increasingly made in the private sector. States Parties can encourage private sector partnerships and avail themselves of the benefits that cooperation with private industry can offer by creating a stable policy environment in which these industries can operate.

⁶ Pugatch Consilium, “Building the Bioeconomy 2015: Examining National Biotechnology Industry Development Strategies Globally,” <http://www.pugatch-consilium.com/reports/Pugatch%20Consilium,%20Building%20the%20Bioeconomy%202015,%20Executive%20Summary.pdf>.