

AI AND BIOSECURITY: WHAT'S IN A NAME?

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CONTEXTUAL ESSENTIALS

Landscape of security risks is evolving faster than the multilateral diplomacy produces solutions to global problems.

Consensus exists that the BWC regime needs strengthening. The SPs should continue developing verification mechanisms for the BWC.

The BWC “intersessional program”: Commencing in 2003, an annual cycle of intersessional meetings has been established, consisting of two distinct sessions: a two-week summer "meeting of experts" (MX), which compiles a comprehensive factual report on the designated topic or topics for the year; and a one-week "meeting of states parties" (MSP) at the year's conclusion, where consensus is sought to formulate a final document, encompassing conclusions to be deliberated at the forthcoming review conference.

AI is just another addition to the toolbox of dual-use technologies.

The term “dual-use” refers to anything with both a beneficial and harmful uses.

In the context of biosecurity, the term “harm” means harm to the health of humans, animals, plants, harm to environment, harm for products of plant or animal origins.

All technological imperfections and vulnerabilities inherent to AI in general are valid for AI-enabled tools in life sciences.

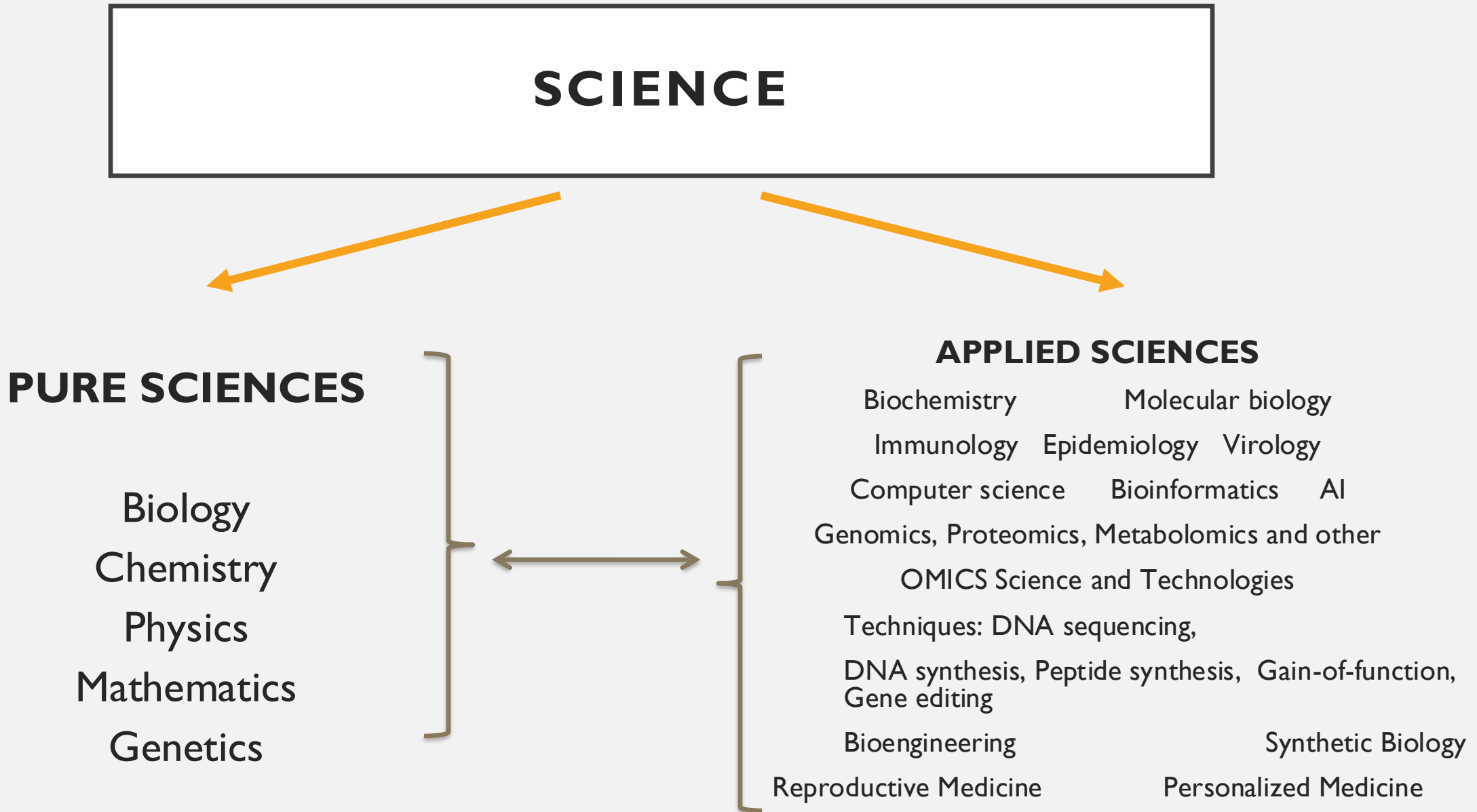
SUMMARY

Global biosecurity challenges include but are not limited to WMD proliferation risks. However, the BWC remains the only framework for inclusive and comprehensive multilateral dialogue on global biosecurity.

The essence of biosecurity policy is intersectoral. However, expert discussions on many critical biosecurity issues got stuck in isolated echochambers (WHO, FAO, WOA, BWC). Therefore, there are no commonly shared concepts of “biosecurity”, “synthetic biology”, “gain-of-function”, “dual-use research of concern” etc. Many global biosecurity issues remain “homeless” or “unattended” in the BWC intersessional program.

Discussions pertaining to AI are conducted during the BWC meetings, yet the potential risks associated with the convergence of AI and biotechnology are confined within the agenda item dedicated to the examination of different scientific and technological advancements relevant to the BWC.

SCIENCE



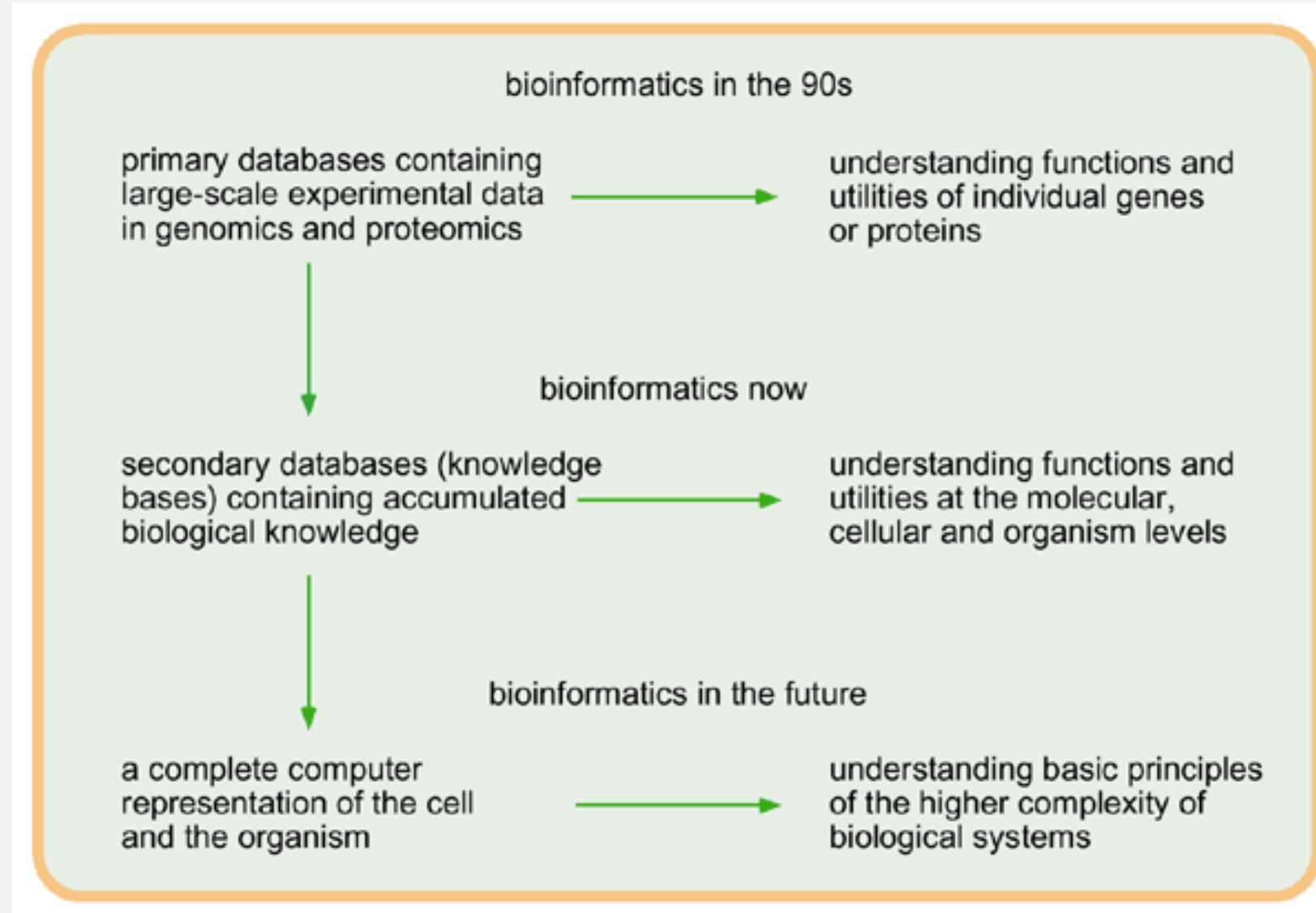
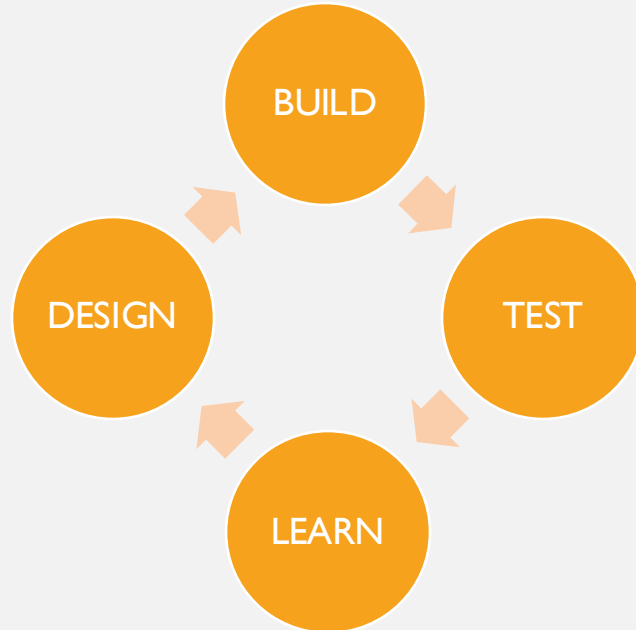
PURE SCIENCES

Biology
Chemistry
Physics
Mathematics
Genetics

APPLIED SCIENCES

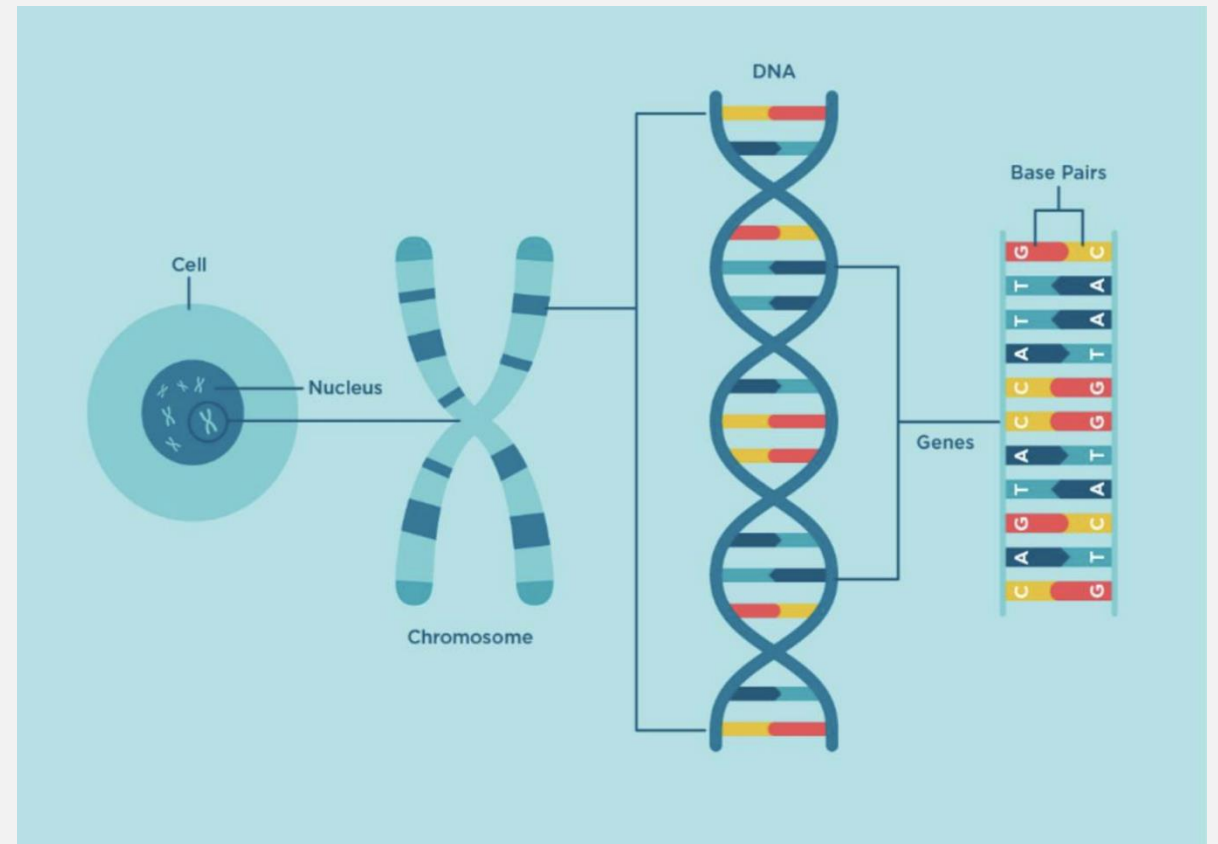
Biochemistry Molecular biology
Immunology Epidemiology Virology
Computer science Bioinformatics AI
Genomics, Proteomics, Metabolomics and other
OMICS Science and Technologies
Techniques: DNA sequencing,
DNA synthesis, Peptide synthesis, Gain-of-function,
Gene editing
Bioengineering Synthetic Biology
Reproductive Medicine Personalized Medicine

SYNTHETIC BIOLOGY AND BIOINFORMATICS



SYNTHETIC BIOLOGY

- Chemical synthesis of DNA and other big molecules
- Shift from editing “text” to writing it out of scratch (de novo design)
- Highly competitive field
- Powerful driver for the development of industry-scale biotechnology and bioeconomy
- Production of toxins, bioregulators, new industrial materials, biofuel, portable and rapid disease diagnostic devices, prosthetics, biopharmaceuticals, and tissue-engineered organs



THE CONSEQUENCES OF THE SHIFT FROM HAND- MADE TO AUTOMATED PRODUCTION

- AI is not a game changer in bioeconomy, but quantum computing has the potential to become one
- The language of describing the structure and scale of the biosecurity risks lags behind rapidly developing technologies
- Among the BWC SPs, legislative regulations of synthetic biology vary from state to state
- Biodefence buildup is unfolding



DISCOVERY OF
PROCESSES



REPLICATION OF
PROCESSES



MODIFICATION
OF PROCESSES



DE NOVO
DESIGN

SILO-THINKING AND ANXIETY

Biosafety, biodefence (CBRN protection) and biosecurity communities exist in their epistemic bubbles

National security experts are reluctant to engage in multi-stakeholder discussions both domestically and internationally

The combination of big data and biotech revolution will probably lead to new security vulnerabilities

United Nations
General Assembly

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Seventy-fifth session
Item 102 of the provisional agenda*
Role of science and technology in the context of international security and disarmament

Current developments in science and technology and their potential impact on international security and disarmament efforts
Report of the Secretary-General

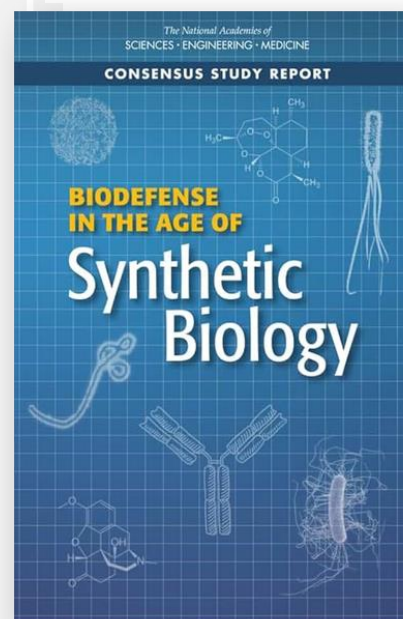
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* A/75/50

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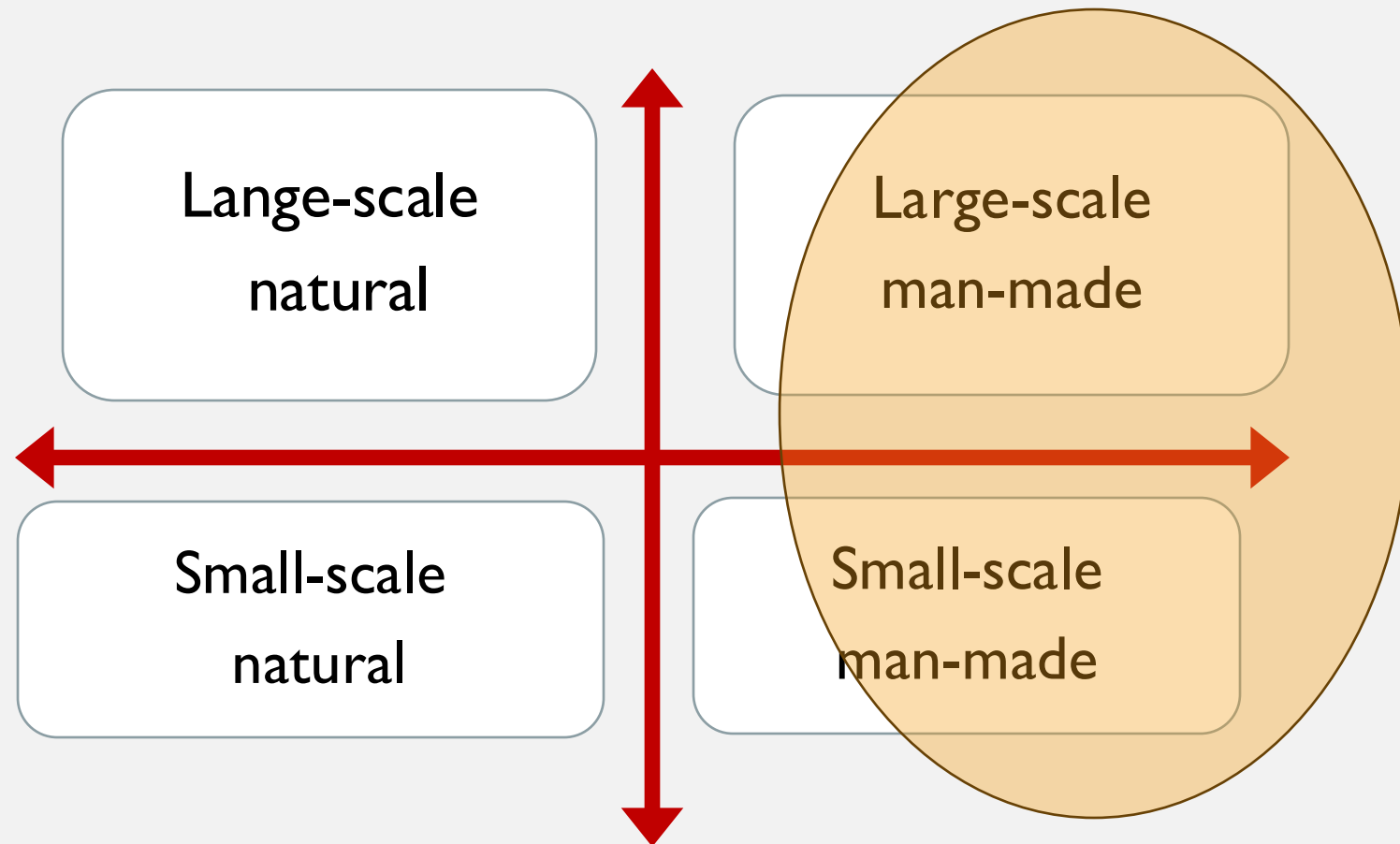


SHARE ON   

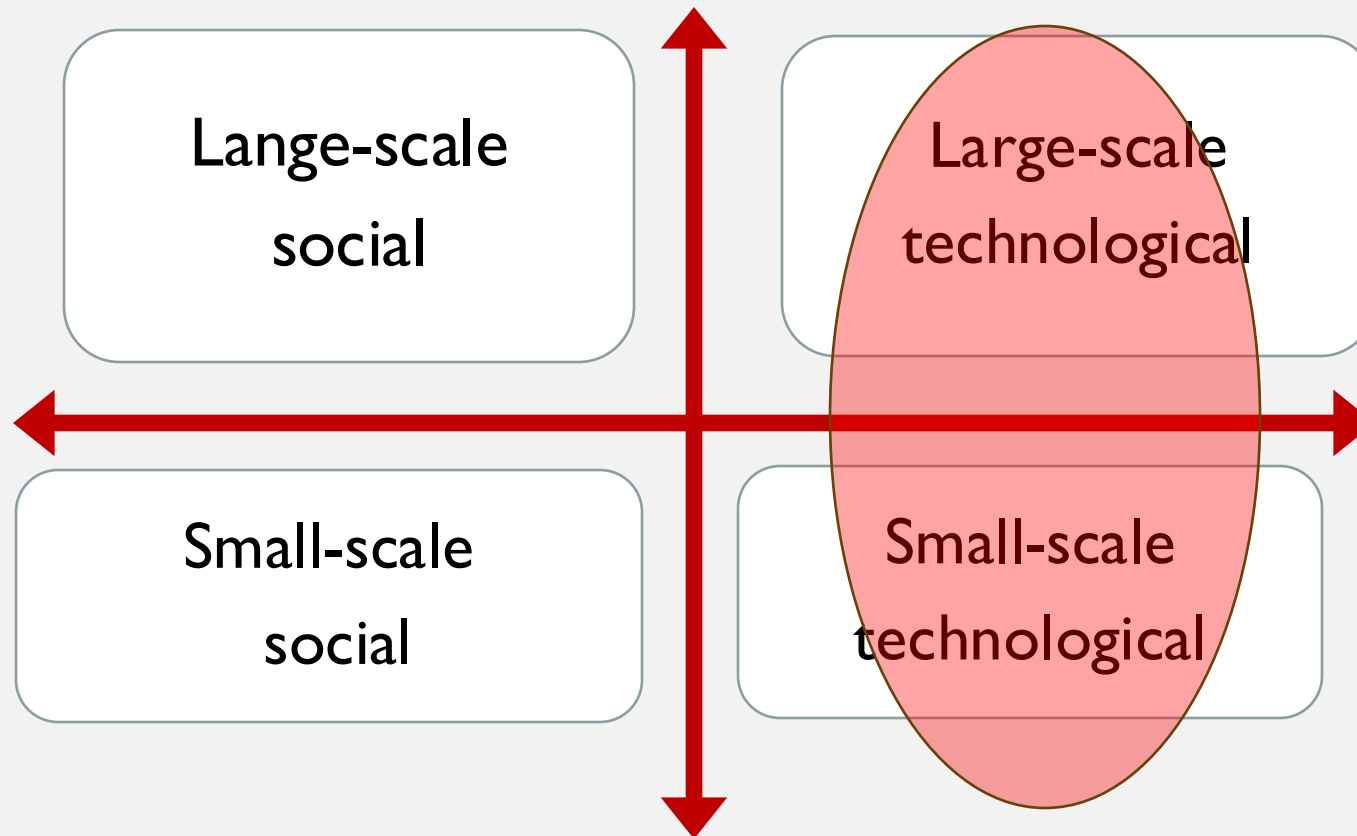
IAP announces the release of its Biosecurity Report “Science and Technology Advisory Mechanism for the Biological Weapons Convention, A Proof-of-Concept Exercise”.

The InterAcademy Partnership (IAP) announces the release of its Biosecurity Report 'Proof of Concept Meeting for a Scientific Advisory Body for the Biological

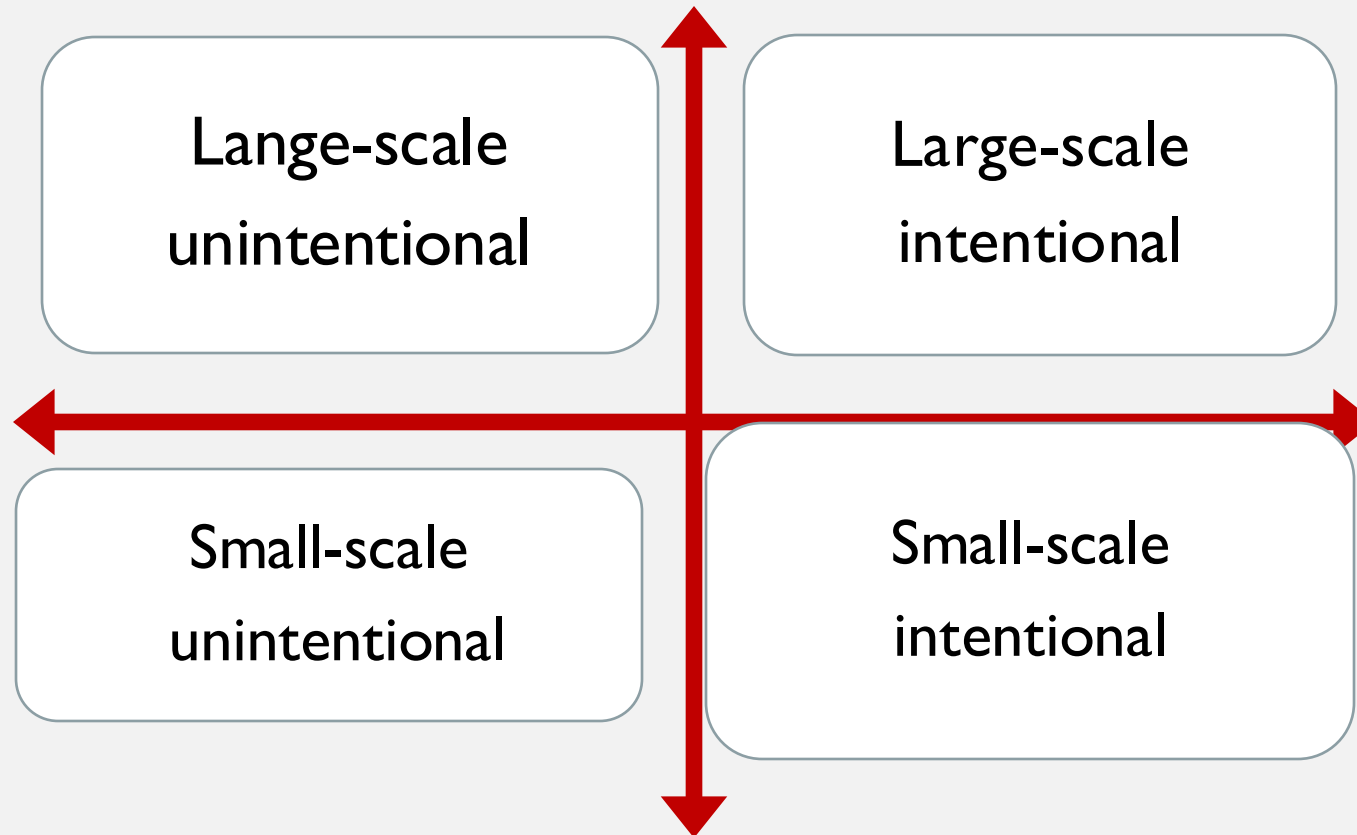
DISEASE OUTBREAK



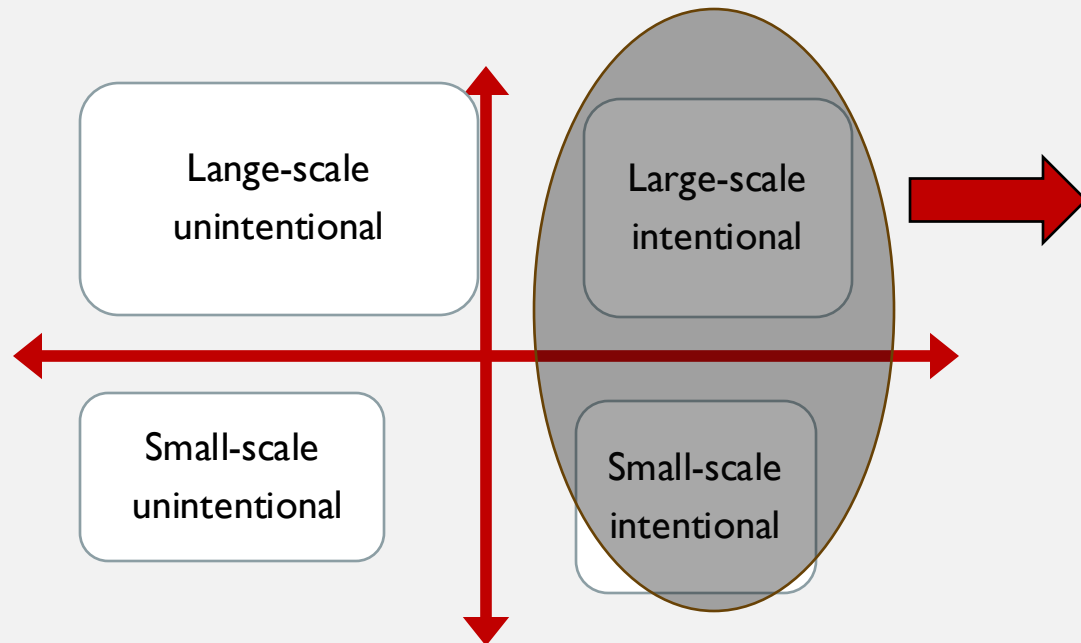
MAN-MADE DISEASE OUTBREAK



MAN-MADE DISEASE OUTBREAK OF TECHNOLOGICAL ORIGIN



MAN-MADE LARGE-SCALE DISEASE OUTBREAK OF TECHNOLOGICAL ORIGIN



Colours of Biotechnology	Fields covered by the respective colour
Red	Health, Medicine & Diagnostics
Yellow	Food Biotechnology & Nutrition Sciences
Blue	Aquaculture, Coastal and Marine Biotechnology
Green	Agricultural, Environmental Biotechnology, Biofuels, Biofertilizers, Bioremediation, Geomicrobiology
Brown	Arid Zone and Desert Biotechnology
Dark	Bioterrorism, Biowarfare, Bio crimes, Bio weaponization
Purple	Patents, Publications, Inventions, etc.
White	Industrial Biotechnology
Gold	Bioinformatics, Nanotechnology & Computational Biology/ Systems Biology
Grey	Classical Fermentation & Bio processors

THE BWC ARTICLE XII

calls on States Parties to
“take into account any new
scientific and technological
developments relevant to
the Convention”.

ARTICLE XII

Five years after the entry into force of this Convention, or earlier if it is requested by a majority of Parties to the Convention by submitting a proposal to this effect to the Depositary Governments, a conference of States Parties to the Convention shall be held at Geneva, Switzerland, to review the operation of the Convention, with a view to assuring that the purposes of the preamble and the provisions of the Convention, including the provisions concerning negotiations on chemical weapons, are being realised. Such review shall take into account any new scientific and technological developments relevant to the Convention.

THE IMPACT OF NEW AND EMERGING TECHNOLOGIES ON THE BWC

as it was discussed at the conference “Global Biosecurity Challenges. Problems and Solutions” (Sochi, 2025)

Article I

It is necessary to monitor scientific and technological achievements that go far beyond the traditional understanding of biological weapons, but at the same time reduce technical barriers to the development and delivery of biological weapons.

Article III

The digitization of biological data and the growing possibilities for DNA sequencing and editing pose serious intangible challenges to existing export control regimes and practices.

Article IV

A number of new technologies raise serious ethical, biosafety, and biosecurity issues. It may have to be reassessed whether States are actually taking "the necessary measures to prohibit and prevent the development, production and accumulation" of biological weapons.

Article VI

New technologies (big data and DNA sequencing) provide a much wider range of possibilities with which to confirm or refute the validity of alleged violations of the BWC.

Article VII

New technologies are increasing the speed and effectiveness of responses to disease outbreaks and could also be important in helping States at risk from violations of the BWC.

Article X

The digitization of biological data is fundamentally changing the way scientists can share information and collaborate for peaceful purposes.



LOOKING BEYOND THE HORIZON: PERSONAL REFLECTIONS ON THE OPPORTUNITIES FOR STRENGTHENING THE BWC



Verification

If and when the verification mechanism is established, AI may help to plan inspection activities, conduct routing analysis of submitted declarations and inspection teams' reports.
Block chain and other techniques may be applied for safeguard measures

CBMs

Assisting SPs in the process of preparing the confidence building measures submissions (Chat bot etc.)
Analysis of annual CBM declarations

Improved language of description

Build text corpus and develop a predictive linguistics model for biosecurity studies
Build news aggregator for BWC SPs

National Implementation

AI-enabled systems of supervising the compliance with the biosafety standards and biosecurity regulations at the level of facility / laboratory
CBRN Cases Tracker Database

Assistance

AI-enabled technologies can be helpful for solving the tasks of planning, cargo tracking, warehouse management, and other logistics operations

REDUCE GLOBAL BIOSECURITY RISKS WITHOUT HINDERING SCIENTIFIC PROGRESS



Improve national legislation and regulatory measures

Build regional partnerships and integrate them into the BWC framework

Promote Bioethics and Science Diplomacy

Support the ISU of the BWC in their raising awareness efforts

Learn lessons from the NPT and the CWC regimes but

Stay tuned to what's going on in the cyber-, space- and AI segments of disarmament diplomacy

Q&A SESSION