

**Dr Jean Pascal Zanders**

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# **ASSESSING THE RISK OF PROLIFERATION: THE BIOLOGICAL DIMENSION**

# WHAT IS BIOLOGICAL WARFARE?

Biological warfare is the intentional application against humans, animals or plants for hostile purposes of

- + disease-causing micro-organisms (e.g., bacteria);
- + other entities that can replicate themselves (e.g., viruses, infectious nucleic acids and prions)
- + toxins, poisonous substances produced by living organisms (and their synthetically manufactured counterparts), including
  - × micro-organisms (e.g., botulinum toxin),
  - × plants (e.g., ricin derived from castor beans), and
  - × animals (e.g., snake venom)

# TODAY'S ASPECTS OF THE BW THREAT

- × **Deliberate use of disease in war**
  - + Against humans
  - + Against animals and plants
  - + For economic and societal disruption
- × **Terrorism and criminal activities**
- × **Misuse of scientific and technological developments**

# PERSPECTIVES ON THE BW THREAT

- ✘ **Use of biological and toxin weapons has so far been extremely rare**
  - + Since 1975, fewer than 100 persons have been killed through deliberate disease
    - ✘ Most cases involved toxins
    - ✘ Most cases were criminal in nature
  - + Major terrorist BTW programmes have been total failures (Rajneesh Cult; Aum Shinrikyo)
  - + However, anthrax letters demonstrate the potential for low-casualty — high-impact events
  - + Most bioterror events do not involve actual agents (hoaxes)
- ✘ **Nature poses by far the greatest challenge**
  - + Infectious diseases are responsible for
    - ✘ > 13 million deaths annually ( $\approx$  number of fatalities in the Twin Towers attacks on 9/11 every two hours)
    - ✘  $\frac{1}{4}$  of all deaths worldwide
    - ✘  $\frac{1}{2}$  of all deaths in developing countries
  - + 1918: Spanish Flu caused more fatalities worldwide than World War 1
  - + Emerging diseases: SARS; West Nile Virus; Avian flu (H5N1 and H7N9)
  - + AIDS in Africa: threat to social fabric of societies
  - + Foot and Mouth Disease outbreak in the UK; Swine Fever in Taiwan, etc. (economic impact)
- ✘ **We have arrived in a post-proliferation stage**
  - + Biotechnology (equipment, processes, products, knowledge) has become universal
  - + Developing countries (Cuba, India, Indonesia, Iran, Malaysia, Pakistan, etc.) have become original sources of innovation and, in some cases, technology exports

# MODERN BIOLOGICAL WEAPONS AND WARFARE: CONFLUENCE OF SEVERAL TRENDS

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## × **The scientific understanding of disease**

- + Three critical characteristics of disease uncovered in 19<sup>th</sup> century:
  - × Infectious disease is caused by an agent (pathogen)
  - × The agent can be transmitted from one living organism to another (infectiveness)
  - × One agent is responsible for one disease only
- + Manipulation of the pathogen
  - × Isolation
  - × Cultivation (while maintaining its infectiveness)
  - × Production in large quantities
  - × Effective dissemination

## × **The new industrial revolution**

- + Biotechnology & informatics are the driving force
- + Major impact on all aspects of life in developed and developing countries
- + Biotechnology has accelerated development of societies (emerging economies)
- + Convergence with other scientific disciplines (e.g., chemistry, informatics, etc.)

## × **Military application of new scientific and technological developments** has become commonplace (= exploitation of 'dual-use' potential)

- + Pressures to exploit new biology and biotechnology for military goals will grow
- + Many arguments in favour framed in humanitarian discourse (e.g., so-called non-lethal weaponry → convergence with chemistry for incapacitating agents)

# POTENTIAL FOR FUTURE WEAPON DEVELOPMENT

- × **Biology and biotechnology allow for the manipulation of disease on the sub-cellular level (genes, biochemical processes, etc.)**
  - + May make the effects of biological agents more controllable
  - + May produce agents with higher infectivity or ability to overcome medical defences
  
- × **Interference with the natural immune system rather than dissemination of pathogen may become new mode of attack**
  
- × **Improvements in analytical and production processes:**
  - + Higher quality & higher quantities in smaller units
  - + Technologies become common place (classroom equipment; bio-hacker laboratories)
  
- × **Possible application of synthetic biology and nanotechnology in agent design or dissemination technology, as well as in defence, protection and prophylaxis**
  
- × **May contribute to novel ways of agent dissemination**
  - + Aerosol techniques
  - + Targeting of specific genes

# CORE TREATIES BANNING BW

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- × **1972 Biological and Toxin Weapons Convention (BTWC)**
  - + Bans development, production and stockpiling of BW and toxins
  - + Ban on use explicitly referred to at 4<sup>th</sup> Review Conference (1996)
  
- × **1925 Geneva Protocol**
  - + Bans the use of CBW in war
  
- × **1993 Chemical Weapons Convention (CWC)**
  - + Bans development, production, stockpiling and use of toxins

# PREVENTING BIOLOGICAL WEAPONS

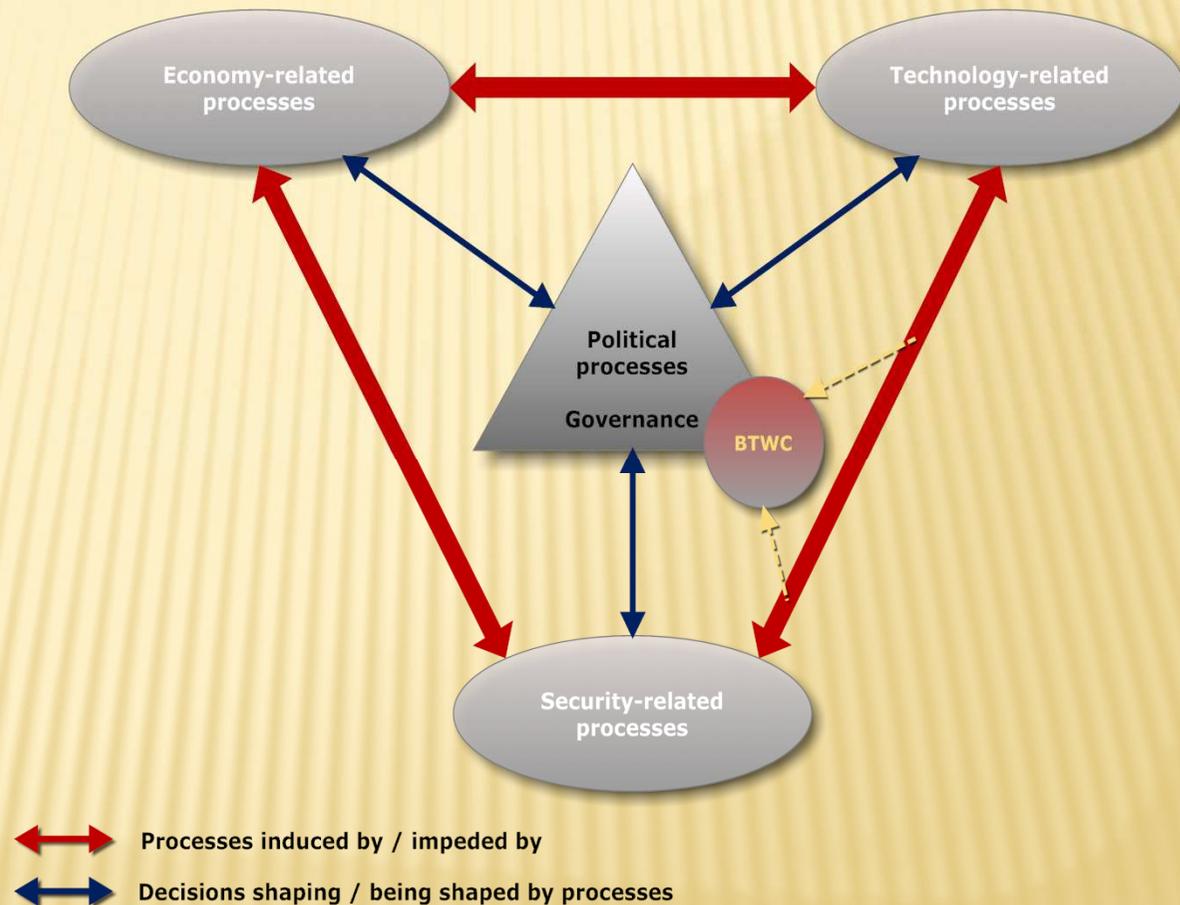
- × **Logical point of entry: weapons and their application**
  - + However, treaties only govern inter-state behaviour
    - × Biological warfare (states) / terrorism / crime
      - need for domestic (criminal, penal) legislation
    - × *Prevention* of terrorism:
      - also responsibility of the individual
  
- × **Possible additional points of entry**
  - + Prevention of disease (irrespective of origin of outbreak)
  - + Preserving biology and biotechnology for peaceful purposes (societal advancement, economic development, health security, food security, etc.)
  - + Environmental security (impact of accidental or purposeful introduction of organisms in new biotopes or of modified organisms)

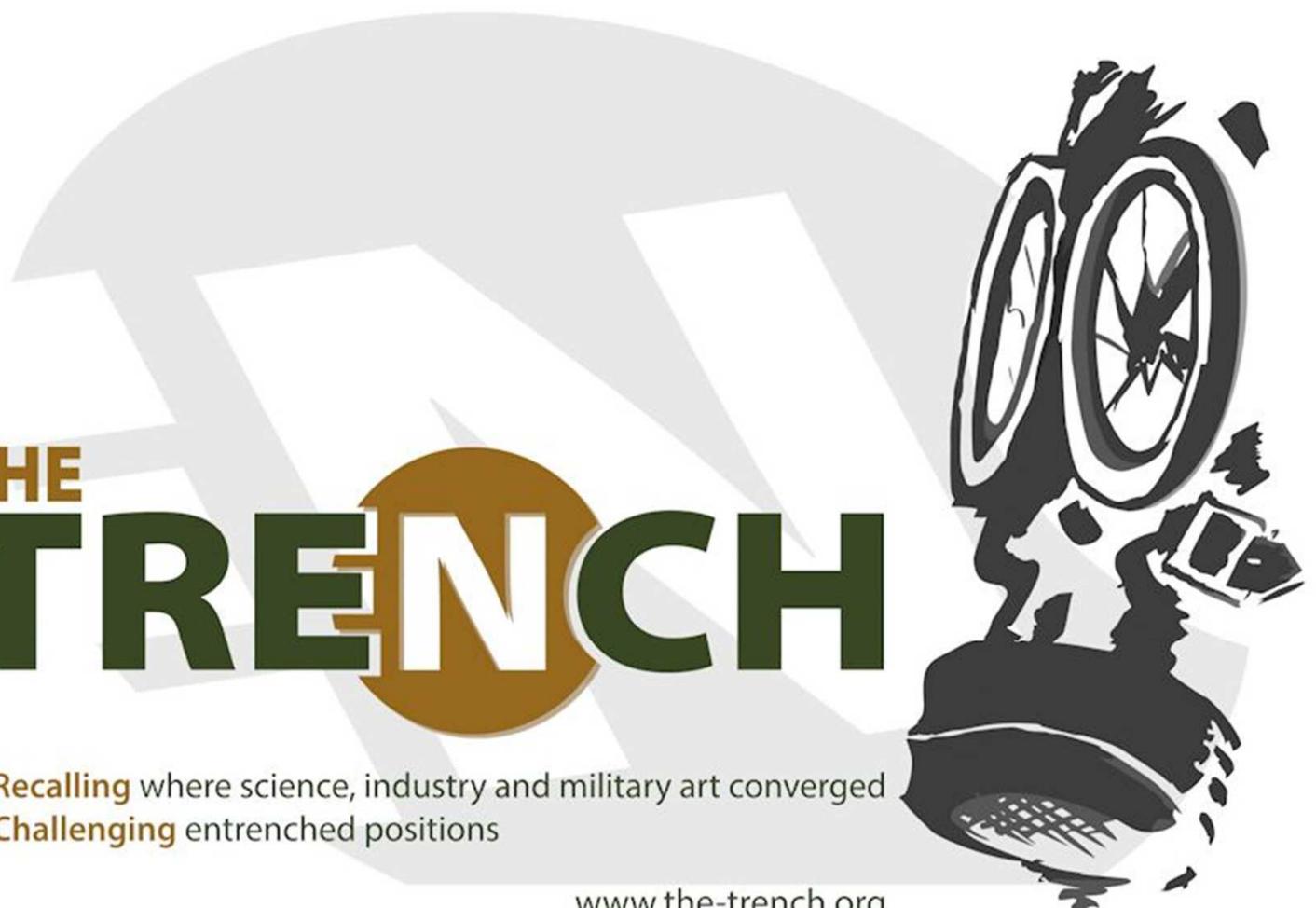
# A MULTI-LAYERED & MULTI-SECTORIAL GOVERNANCE MODEL?

- × **Weapon control**
  - + Multilateral agreements (Geneva protocol, BTWC, CWC)
  - + Proliferation prevention arrangements (Australia Group, PSI, Global Partnership, etc.)
  - + UN agencies: UNSC, UNODA, 1540 Committee, UNEP, UNDA, etc.
  - + National laws and regulations (criminal, penal, trade, safety, etc.)
- × **Disease prevention**
  - + WHO, FAO, OIE + their regional organisations/initiatives
- × **Crime and terrorism**
  - + UNSC Resolutions (1540, terrorism resolutions, etc.)
  - + Interpol, Europol, etc.
- × **International transfers**
  - + WTO, WCO, etc.
- × **Economic actors**
  - + Companies (national, multinational, transnational)
  - + Research institutions
  - + Individuals
- × **Instruments of collective & individual governance**
  - + Codes of conduct; Professional codes; Ethics
  - + Awareness-raising & education
  - + Whistle-blower protection schemes

# WHAT FUTURE ROLE FOR THE BTWC?

- No unified model for governance of weapon control anymore
- New stakeholders and security actors
- Increased role of non-state national & transnational actors
- Shifting relative balances of powers (economy, politics, military) and multiple power centres (polycentrism)
- Geographical decentralisation of business and industry activities
- South-south trade patterns and impact on technology diffusion
- ***Declining role of states in shaping developments, but many states reject formal governance responsibilities for non-state actors under BTWC***





# THE TRENCH

Recalling where science, industry and military art converged  
Challenging entrenched positions

[www.the-trench.org](http://www.the-trench.org)

*E-mail*

[jpzanders@the-trench.org](mailto:jpzanders@the-trench.org)