Technical Means with Relevance for Compliance - The Role of Open Source Information

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Contents

Part I: Technical Confidence Building Measures

- Historical perspective: What do we learn from the past?
- New approaches: What could we do in the future?

Part II: Use of Open Source Information in Compliance Monitoring

- The Big Data Universe
- Bringing things together: the analytical approach

Part I: Technical Confidence Building Measures

Confidence Building in the context of the Biological Weapons Convention

How to promote confidence building? *Examples:*

- Declarations (e.g. CBMs)
- Exchange of information & expert views during the ISPs
- Peer review mechanisms
- Practical exercises of the UNSGM for the investigation of alleged use of BW
- **Technical Means** (applicable also for a voluntary continuous monitoring of certain fields of interest)

Part I: Technical Confidence Building Measures

Confidence Building in the context of the Biological Weapons Convention

Problem:

The inherent dual use dilemma in biological sciences makes it rather difficult to determine the intent!

- Almost all techniques, equipment, and many biological materials show a dual use potential
- Single pieces of information often give unsatisfactory results in deciphering the intention behind activities

Combinatorial approaches are required!

1970ies:

How to monitor compliance within an upcoming biological arms control regime?

Part I: Historical Perspective

Detectable footprint in the open source data universe?

How to assess compliance with the BWC?

Possible activities in violation of the BWC:

- **Research** [for non-peaceful purposes]
- **Development** [for non-peaceful purposes]
- **Field testing** [of BW agents, delivery and dissemination]
- **Production** [of BW agents & bioweapons at large-scale]
- **Transport and storage** [of bioweapons]
- **Training** [troops, civil protection services]

Source: The Problem of Chemical and Biological Warfare - Vol. V (SIPRI, 1973); modified.

1973

Part I: Historical Perspective

How to assess compliance with the BWC?

Monitoring methods:

- **Inspections** [of laboratories, production facilities etc.]
- **Budgetary inspections**
- **Remote observation** [e.g. production facilities]
- **Economic analysis** [e.g. trade monitoring]
- **Literature surveillance** [research, applied S&T, patents,...]

Applicable by analysing open source information

Source: The Problem of Chemical and Biological Warfare - Vol. V (SIPRI, 1973); modified.

1973

Part I: Historical Perspective

How to provide information on compliance?

- **Secret flows of information:** e.g. remote observation (aerial or satellite surveillance), sensors on the ground to analyse air or water samples
- **Formal international monitoring:** inter-governmental agreements to open up information otherwise not available
- **Informal international monitoring:** citizens of a country take part in information gathering and sharing
- **Open flows of information:** press, radio, official reports, scientific literature, „gossip“ etc.

Source: The Problem of Chemical and Biological Warfare - Vol. V (SIPRI, 1973); modified.

1973

Applicable by analysing open source information

Part I: Historical Perspective

How to assess compliance with the BWC?

Off-site monitoring methods:

- **Data exchange** (declarations, notifications)
- **Inspections** (including sampling and identification)
- **Remote sensing** (surveillance by satellite/aircraft, ground-based)
- **Information monitoring** (publications, legislation,...)

Applicable by analysing open source information

Source: Summary Report (BWC/CONF.III/VEREX/8); modified.

1993

Part I: Historical Perspective

How to assess compliance with the BWC?

On-site monitoring methods:

- **Exchange visits**
- **Inspections** (including sampling and identification)
- **Continuous monitoring** (by instruments, by personnel)

Source: Summary Report (BWC/CONF.III/VEREX/8); modified.

1993

Conclusion I:

Evaluated methods and technical means are known to monitor compliance with the BWC.

How could open source information contribute to compliance monitoring?

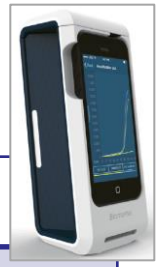
Part II: New Approaches

Possible Technical Measures (TM): Remote sensing

1990ies		Today	
TM	**Purpose**	**TM**	**Benefits**
Surveillance by satellite (military/commercial): specific acquisition tasks required	**Determine characteristics** of known facilities, test fields etc. + continuous monitoring **Detection** of suspicious facilities, test fields etc. + continuous monitoring	**Satellite imagery from open sources:** Google Earth, Bing, Here etc.; Landsat 5 **Ground-based imagery:** Panoramio Google Street View; Flickr, Twitter, Facebook **Annotations:** Wikimapia	**Free access to images with high resolution** Global search possible Time series from historical imagery archive **Document + share results!**

Part II: New Approaches

Possible Technical Measures (TM): Diagnostics



1990ies		Today	
TM	**Purpose**	**TM**	**Benefits**
Classical methods in diagnostics Rapid detection assays Spectroscopy Biosensors	**Detection and identification of biological agents** in a variety of different samples (water, air, soil, wastes etc.)	**Next Generation Sequencing** **Mobile/handheld PCR machines** Spectroscopy (Upcoming: **Lab-on-the-Chip** analytical devices)	Flexible, fast and specific Customised detection Non-invasive measurement Combinatorial analytics

Part II: New Approaches

What could we do in the future?

The increasing accessibility of

- a variety of **open source information** including technical and scientific data
- new **analytical techniques** applicable even by semi-professional users

will globally enable more and more actors to contribute compliance-relevant information.

What to do with these information? How to make them usable within the BWC regime?

What is OSI?

"Open source information may be defined as that information which is **publicly available and that anyone can lawfully obtain by request, purchase, or observation** (under consideration of legal copyright requirements)."

Source: U.S House of Representatives Committee

What is OSI?

Categories:

1. The expertise of individual experts,
2. Commercial data,
3. „Grey“ literature, such as written information by the private sector, government sources, and academia that available on only a limited basis.
4. Information that is widely available to anyone.

„Big data“ as subset of OSI.

Limitations of Big Data

Challenge	Solution
Amount	Filter the data
Correctness	Verify the data
Steadyness:	Save the data
Variability	Make the data compatible
Comprehensiveness	Complete the data
Language	Translate

With awareness of these limitations:

Highly valuable dataset,
which is applicable to treaty monitoring.

Why use Open Source Information?

- Because it's there!
- No stakeholder can run away any longer from the fact that relevant information are available in open sources,
- The regime is weakened if its functions are not supported by informational input,
- With the absence an official mechanism to gather, and evaluate compliance relevant information, experts/NGOs will do so.

Using OSI is not! OSINT!

80-90 % OSINT in the intel of States

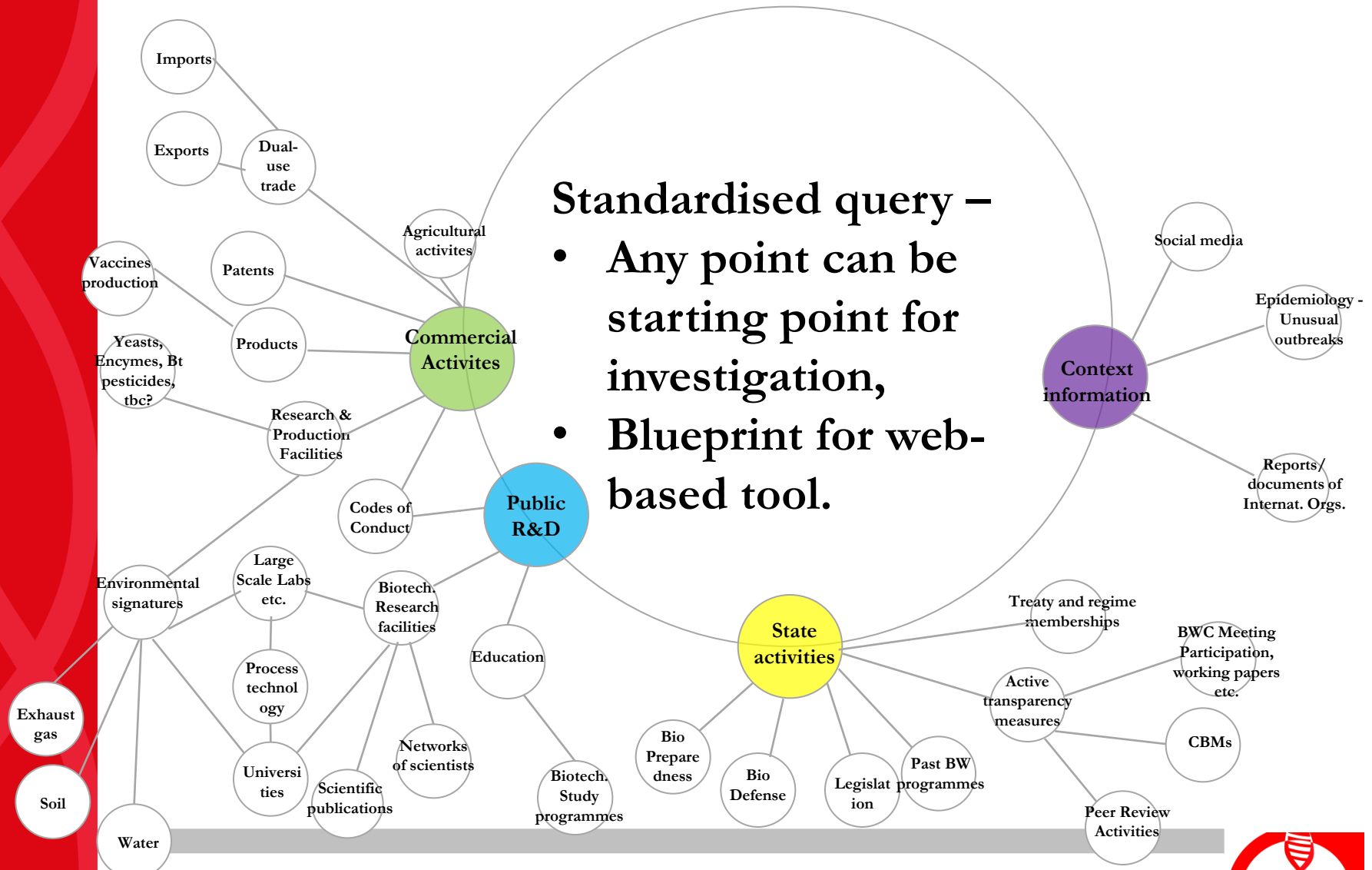
but OSINT does not produce transparency!

- **NTMs**: exclusive technology: **Secrecy**
- **PTMs:** public/open source technology: **Public transparency**.

Goals of OSI-analysis by civil society

- **To build transparency and therewith:**
  - Provide an empirical groundwork to foster confidence in compliance with articles I and III,
  - Facilitate an informed debate on the implementation of article X,
  - Identify qualified questions rather then proofs.

Part II: Use of Open Source Information in Compliance Monitoring



Standardised query –

- Any point can be starting point for investigation,
- Blueprint for web-based tool.

Carl Friedrich von Weizsäcker-Centre for Science and Peace Research

Research Group for Biological Arms Control

Context information

Epidemiology/unusual outbreaks:

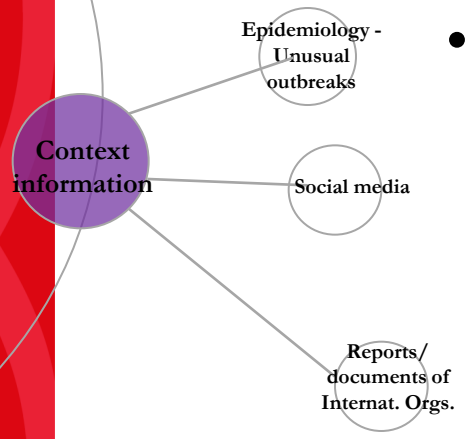
- medisys.org, healthmap.org,

Reports of International Organisations

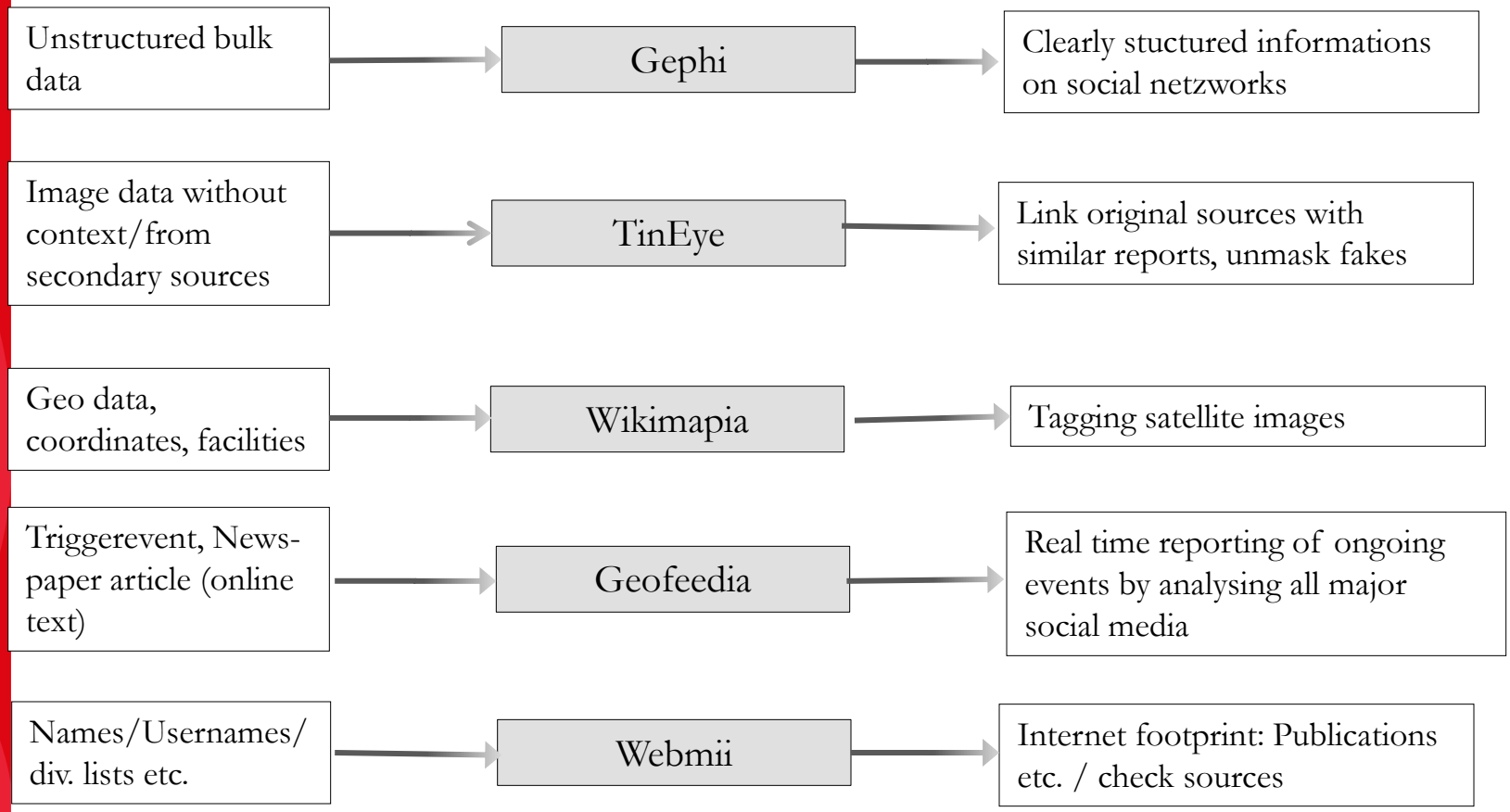
- Seldom Cases

Social media:

- Free use / licenses for a number of online tools



Analysis of specific internet content



State activities

Treaty memberships: BWC, CWC, Cartagena,…?

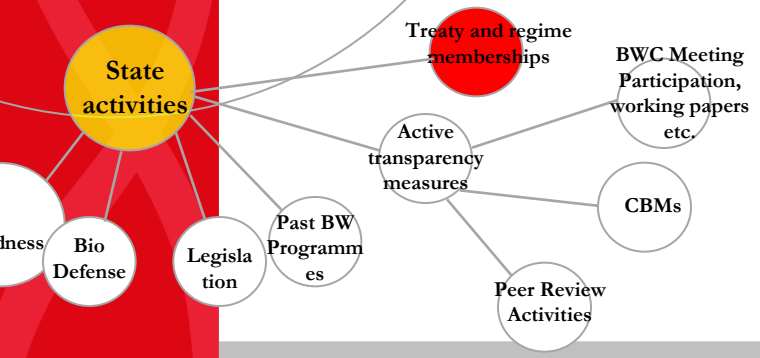
Legislation: Sufficient?

Bio Defense: Any programme; suitable?

Bio Preparedness: Any activities; suitable?

Active transparency measures: CBMs, Peer Review activities,…?

Past BW Programmes: Sufficient information?

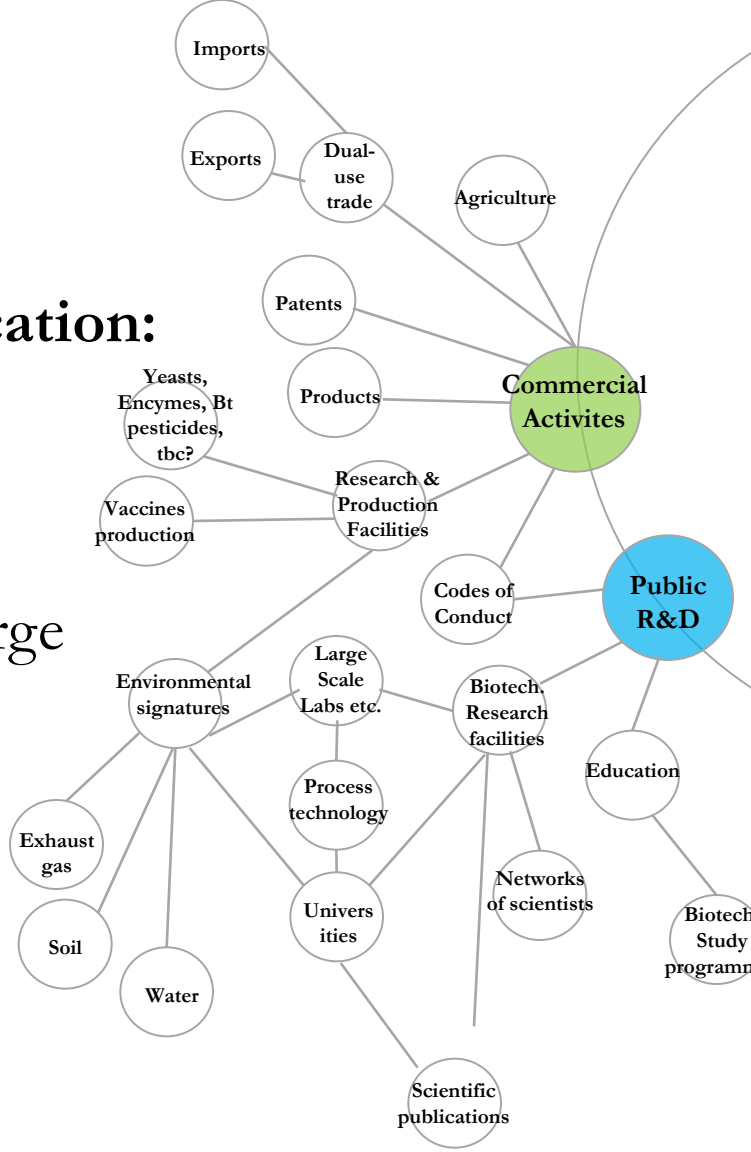


Public R&D

General biotech/life sciences education:
Study programmes in the life sciences and biotechnology?

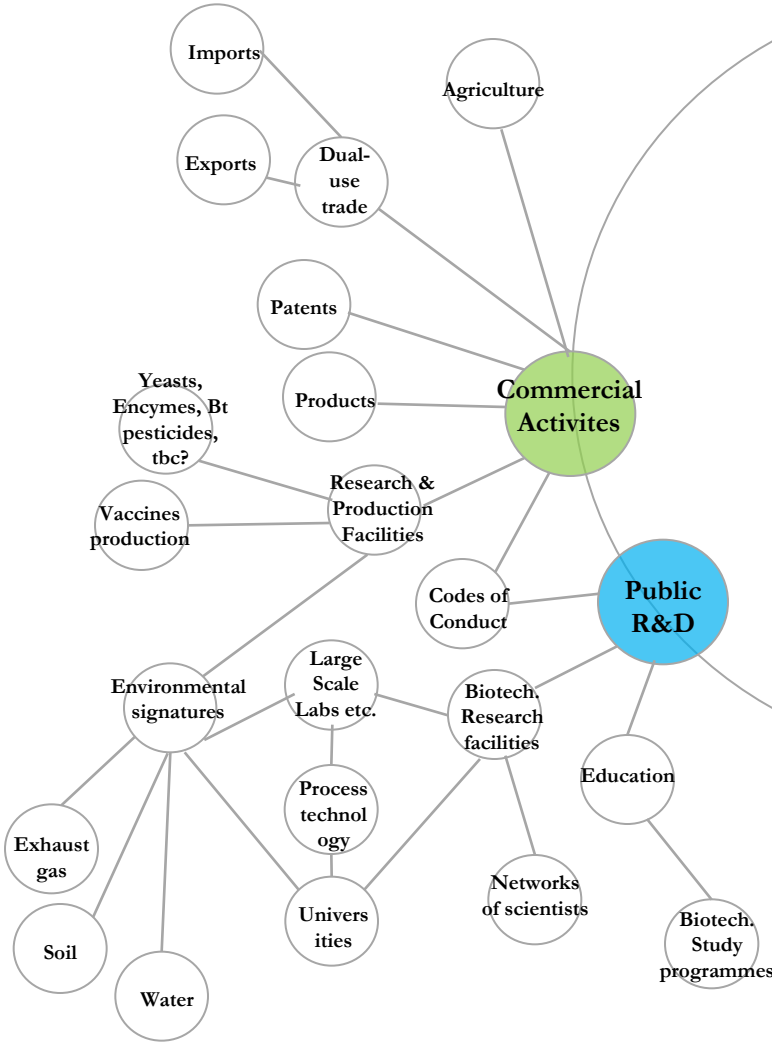
Bioprocess technology education:
Know-how on the construction of large scale production facilities?

Large scale research institutions:
Transparent work programmes,…?



Commercial Activities

Patents: what is being developed for commercial use?
Bio-pharma products: products, production facilities,…?
Relevant agriculture:
e.g. castor beans?



Conclusion

- **Technical revolutions open the door** towards the effective use of PTMs,
- Increased (public) transparency is **indispensable in the regime**,
- A public OS mechanism **is not OSINT,**
- Requirement of a **standardised methodology,**
- **Exchange with other fields** prerequisite!
- OSI based monitoring also with **high relevance for activities under article X.**

Thank you!