Why policies should be based on „the best available scientific knowledge“ and not on „sound science“?

Christine von Weizsäcker

Contribution to the Conference „Science and Policy in Times of Crises and Dissent“
Athens
17 May 2025

Do these two terms not have pretty much the same meaning?

When fake news and fake information flood internet, media and policies why does the legal word smithing at multilateral environmental negotiations matter? Does it?

Should we not stand together and defend both „sound science“ and the „best available scientific knowledge“?

The UN High Commissioner on Human Rights, Volker Türk, contributed the following paper to the scientific journal „Nature“ which was published on 1st November 2023:

Protect the „right to science“ for people and the planet. Upholding human rights can ensure that environmental policy is driven by facts and evidence, not denialism, greed and profit.

https://www.nature.com/articles/d41586-023-03332-8?utm_source=Live+Audience&utm_campaign=035a9c07d5-briefing-dy-20231106&utm_medium=email&utm_term=0_b27a691814-035a9c07d5-51906980

Antonio Guterrez, Secretary General of the United Nations repeatedly made the point: Without emphasis on and implementation of Human Rights the United Nations are de facto closing down.

SUSTAINABLE DEVELOPMENT GOALS

On September 25th 2015, countries adopted a set of goals to **end poverty**, **protect the planet** and **ensure prosperity for all** as part of a new sustainable development agenda. Each goal has specific targets to be achieved over the next 15 years.

For the goals to be reached, everyone needs to do their part: governments, the private sector, civil society and people like you.

17 Sustainable Development Goals

A hotchpotch of demands and wishful thinking from many different fields and sectors.

Different ministries are reponsible for different sectors.

Different branches of industry are differently affected by one or more goals.

Different states in different regions around the globe have different priorities in their national implementation.

Different social groups have different access to power and decision-making and are differently affected by risks and benefits of different goals.

Environment Ministries and environmental civil society organisations keep complaining that environmental SDGs only rank in positions 13, 14 and 15 in a catalogue of 17.

Instead of complaining it can be argued that the essential first two SDGs (No Poverty and Zero Hunger and Sustainable Agriculture) can only be achieved if SDGs 13, 14 and 15 create the basis of this achievement. Actually, SDGs 13, 14 and 15 are the necessary precondition for all other goals. This is also relevant for the goal on peace which cannot be reached if conflicts on ever scarcer resources increase and the very basis of livelihoods is seriously threatened.

SDG 1: No Poverty

The poor do not have the money to buy their survival in the global market competition.

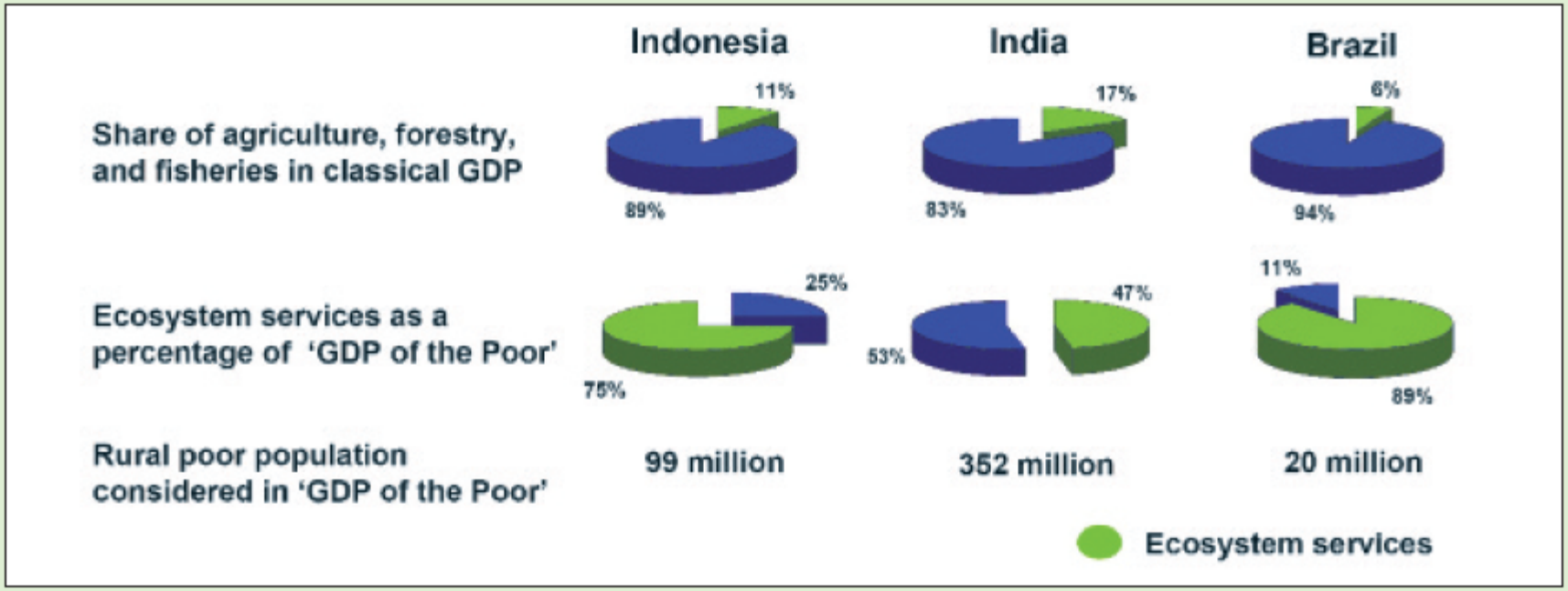
They need climate action, biodiversity protection and sustainable use. They need rights and they need precaution. They cannot buy their way out of damage and catastrophies. They cannot „discount the future“, as the rich can do.

What does „discounting the future“ really mean? To accumulate money by „business as usual“ and then use that money to buy the way out of the damages caused by these strategies.

The Stern-Report on Climate Change and the TEEB and Gupta Reports on Biological Diversity showed that such discounting strategies are macroeconomic nonsense.

Neither the State nor the formal Market but Ecosystems provide for the Livelihoods of the Poor

Figure 2: 'GDP of the poor': estimates for ecosystem service dependence



Source: TEEB for National Policy, Chapter 3 [N3]

Biodiversity is our future life insurance in a changing world

The Executive Secretary to the Convention on Biological Diversity, Dr. Ahmed Djoghlaf, in 2005 when the Millennium Ecosystem Assessment was launched.

Should we continue to trust in „business as usual economics“, i.e. attract investors and hope for the never really confirmed „trickle down effect“ for the poor?

Or can we learn from recent Nobel Prizes in Economics?

Amartya Sen, 1998, for his contribution for welfare economics

Joseph E. Stiglitz, 2001, for his contribution to analyses of markets with asymetries of information

Elinor Ostrøm, 2009, for her analysis of economic governance, especially of the commons.

It is not only about risks to whom but also of economic potential for whom – often unfairly distributed.

There often are direct benefits in innovative fields:

1. **researchers profit from increased funding of their projects;**
2. **companies increase their shareholder value with these new promises.**

So, there are early benefits for some, at a time when neither benefits nor risks for all other constituencies and concerns had the chance to be thoroughly investigated. Thus we arrive at the often used terms „unquestionable benefits“ and „hypothetical risks“.

This leads to the conclusion that the poor and underpriviledged need prevention of identified risks but are also need to be protected by precaution if there are strong indications of potential risks.

How do the two terms „sound science“ and „best available scientific knowledge“ interact with this?

The Precautionary Principle

In situations where scientific knowledge is imcomplete and if there are indications of severe and/or irreversible harm, states should act.

Sound Science Principle

Unless there is complete scienific evidence on the Causal Chain leading to a certain damage, unless results are published in peer reviewed relevant journals and unless there is scientific consensus governments may and must not act. Any such action would be interpreted as violation of free trade agreements.
Between strong indications and final scientific conclusion there may be decades of harm.

The difference between these two legal concepts

Pertaining to environmental protection and consumers‘ protection and rights was the central bone of contention between US and Europe in the negotiations of the **Transatlantic Trade and Investment Partnership, TTIP. And is still pertinent to all recent trade negotiations**

„Best available scientific knowledge“ is in alliance with the Precautionary Principle which seems, after all, to be a

Pro-Poor-Strategy.

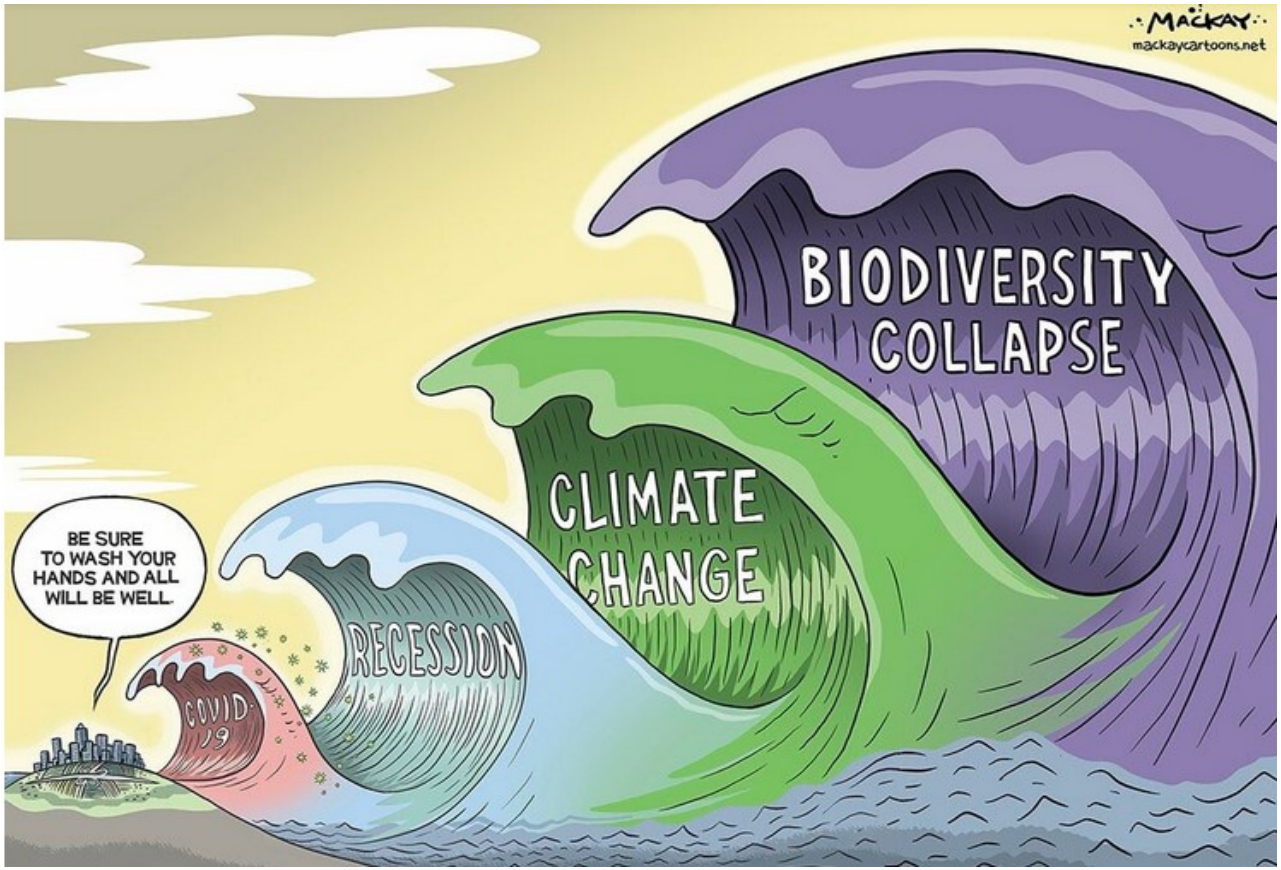
„Sound Science“ means that Prevention is possible, but only if the causal chain has been completely proven and if there is scientific consensus. Thus „Sound Science“ means

Postponement of governance

Reversal of the Burden of Proof

The Poor cannot discount the Future and suffer.

This well-known picture of multiple crises is yet incomplete. Let us not forget about ongoing poverty, hunger, violence, disasters and conflicts.



How does „Science“ react to these multiple crises?

On the one hand:
Disciplinary research has standing, established quality standards and receives the bulk of funding. Disciplinary journals for peer-reviewed papers are still prevalent. Scientific careers still depend on such publications. In certain new fields the expertise is narrow. How about universities? Even public sector expertise is not necessarily wide and independent, due to the increase in public private partnerships, patent applications and the increasing political perception of universities as priority factors in a country‘s global economic competitiveness.
All this makes patentable techno-fixes to selected elements of each of these crises so attractive.

How does „Science“ react to these multiple crises?

On the other hand:

Recent assessments of important international scientific bodies unanimously agree that we have to learn to adress these multiple and interlinked crises in a systemic, multidimensional, cross-sectoral, interdisciplinary, transdisciplinary and participatory way.

Global Assessment of the Intergovernmental Platform on Biodiversity and Ecosystem Services, IPBES: https://ipbes.net/document-library-catalogue/summary-policymakers-global-assessment-laid-out

Assessment Report 6 of the Intergovernmental Panel on Climate Change, IPCC: https://www.ipcc.ch/report/sixth-assessment-report-cycle/

„Peace with Nature“ Report of the UN Environment Programme, UNEP: https://www.unep.org/resources/making-peace-nature

Joint Report „One Health“ by the Convention on Biological Diversity, CBD, and the World Health Organization, WHO: https://www.cbd.int/health/SOK-biodiversity-en.pdf

All these international scientific reports point to the need to identify and address causal links in the network of interactions between all the direct and indirect drivers of these crises, even daring to challenge our present economic system. It means seeking sustainable solutions at all levels. It also means to systematically include other systems of knowledge and alternative solutions, and not to remain chained to the momentarily most fashionable techno-fixes, like geoengineering and the new gene technologies relying on CRISPR-Cas.

It also means, that the multiple capacities for scientific horizon scanning, assessment and monitoring of proposed solutions, projects, programmes, policies, strategies and technologies have to be built. It means that the focus of research and its funding has to be dramatically shifted.

Having natural laws as their topic, however, does not mean that the interests of scientists should be seen as unchallengeable laws of nature.

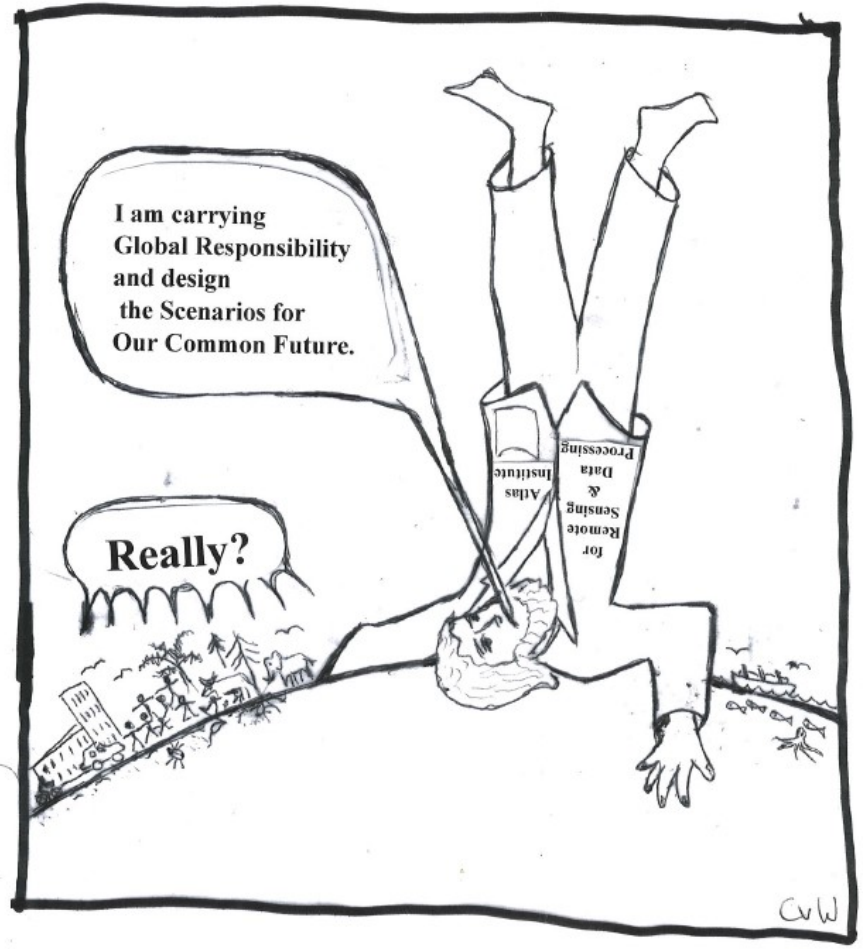
None of the dominant trends in science, technological innovation, and economy have fixed any of the problems, let alone provided systemic harmonized solutions. They have promised to do so for decades, but failed.

Who is good at systemic, multidimensional, cross-sectoral, interdisciplinary, transdisciplinary and participatory solutions? Indigenous peoples, local communities, peasants, family farmers, pastoralists, fisherfolks, agricultural and food workers, landless, women and youth. They needed these talents for their livelihoods. We all would not be here without their talents and experience. And some scientists!

The Atlas-Syndrome

In the Greek Mythology, the Giant Atlas carries the weight of the world on his shoulders.
Even many well-meaning and responsible scientists are not immune to such perceptions.

Christine von Weizsäcker: Competing Notions of Biodiversity. In: Wolfgang Sachs (ed.): Global Ecology. A New Arena of Political Conflict. pp. 117-131.
London, Atlantic Highlands: ZED Books, 1993
ISBN 1-85649-163-3 Hb
ISBN 1 85649-164-1 Pb



Calling us „world hunger“, „workforce“, „human capital“, „natural capital“, „environment“, „CO2-sinks“, „biomass“ is usual. This way of speaking, however, may implicitly already violate our local and historical particularities, distinctiveness, our uniqueness embedded in diversity, our networks of relationships and cooperation, our intrinsic value and our dignity. And cooperative systemic scientific approaches.

The reality of sustainable solutions will depend on creative, cooperative implementation at all levels, including the local one. Scientists are welcome as partners, but not as exclusive conductors and orchestrators of these efforts.

What international tools are available to support and protect such cooperative initiatives and help to contradict the assumption that they are nothing but an old-fashioned, backwards, ideological, uninformed and irrational minority?

The United Nations Declaration on the Rights of Indigenous Peoples, UNDRIP, UN General Assembly 2007

https://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf

The United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas, UNDROP, UN General Assembly 2018

https://digitallibrary.un.org/record/1650694

The United Nations Office of the High Commissioner on Human Rights

e.g. the important Policy Brief No. 1 of the special rapporteur on Human Rights and the Environment „Human rights-based approaches to conserving biodiversity, equitable, effective, imperative, August 21“

https://www.ohchr.org/Documents/Issues/Environment/SREnvironment/policy-briefing-1.pdf

At the interface of science, ethics, law and policy:

Internationally agreed principles

- **Subsidiarity Principle** (since Aristotle, Thomas Aquinus a widely used principle of governance)
- **Universal Declaration of Human Rights** (UNGA 1948, also Intern. Covenant on Economic, Social and Cultural Rights UNGA 1966, the Declaration on the Rights of Indigenous Peoples UNGA 2007, and the Declaration on the Rights of Peasants and other People working in Rural Areas UNGA 2018.
- **Principles of International Law** (Vienna Convention, 1969)
- **Democracy Principle** (Rio Declaration 1992) on Public Information, Public Participation, and Access to Justice in Environmental Matters, implemented by Aarhus Convention, 1998, and Escazú Agreement, in force since a few days.)
- **Prevention and Precautionary Principle** (Rio Declaration, 1992)
- **Polluter-Pays-Principle** (Rio Declaration, 1992)

Principle 15: Precautionary Principle

„In cases of severe or irreversible damage, the absence of full scientific certainty shall not be taken as a reason to postpone measures to prevent environmental damage."

It widens the possibilities of governance in cases of uncertain risks. Well proven risks require prevention. They do not need the application of the precautionary principle.

(explicit in EU Treaty, 191(1), also see: Fisher/Jones/Schomberg (eds.), Implementing the precautionary principle, 2006, the European Court of Justice not only applied it to environment but also to human health, ECJ, *Pfizer Animal Health/ Council*, RS. T-13/99, SLG 2002, II-03305)

Principle 10: Environmental Democracy

„The right of citizens to Access to Information, Participation in Decision-Making and Access to Justice in Environmental Matters." **It has been turned into a legally-binding agreement in the UNECE Region, named Aarhus Convention.** The EU and all its member states are Parties to this convention. http://www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf

A corresponding convention has been agreed on for the Latin American and Carribean Region: The Escazú Agreement.

Principle 16: Polluter-Pays-Principle

„Liability of polluters and redress for victims, also at international level." An EU supply chain legislation that makes polluters liable would be an essential step forward.

Victims pay the price for damage automatically and always. It takes regulation to make the polluters responsible and liableö, a strong incentive for them to apply precaution.

Principle 18: Obligation to notify other states of events that are likely to produce harmful effects on their territories. (may be relevant in the context of new technologies, such as geo-engineering and gene drives)

One of the recommendations and conclusions of TEEB is „changing the incentives“:

The principles of „polluter pays“ and „full-cost-recovery“ are powerful guidelines for the realignment of incentive structures and fiscal reform.

The Economics of Ecosystems & Biodiversity: Mainstreaming The Economics of Nature.
A Synthesis of the Approach, Conclusions and Recommendations of TEEB, October 2010, p 27.

Late Lessons from early warnings

– the precautionary principle 1896-2000

Authors: P. Harremoes, D. Gee, M. MacGarvin, A. Stirling, J. Keys, B. Wynne, S. Guedes Vaz

Environmental Issue Report No 22 =1/2002, European Environmental Agency, Luxemburg (2001)

Fake news complemented by Subtle Strategies of Public Perception Management creating Confusion and Resignation

If reports are confusing and contradicting each other,
if different scientists come up with totally different results,
if the public has no way to validate the results,
if the trust in public research is tainted by public private partnerships,
if the public has no ways and means to participate with meaningful actions,
people very often react with resignation: Nobody knows for sure. I have no say. Why should I bother?

The fact that scientists address laws of nature does not mean that their interests should be seen as a law of nature.

Conflict of Interest Policies and Strategies need to be firmly established and implemented, especially for organisations tasked with research policy, research funding and technology assessment.

We need procedures and structures stop the expertocratic undermining of the separation of political powers, by making legislation, administration and jurisdiction all dependent on the same narrow group of experts in a narrow new field of innovation?

An additional reason why multidisciplinary and transdisciplinary approaches are important! But does it not become too complex?

The term „complexity“ – in politics - is often abused as a synonym for „too difficult for the public to understand“.
„Public keep out, leave it to the experts!“
On the other hand, systems analysis shows us that complex, well-contextualized networks of many variables and concerns can be very stable, more comfortable and allow for good company. Diversity is our life-insurance in a changing world.

The normal method of designing scientific experiments often consists in reducing the number of variables and neglect their interaction in order to arrive at demonstrable and quickly applicable results. Moreover, in technology discourses there is often a grey zone reaching from scientific prognosis to expert opinion, prophesy, wishful thinking and advertising.

Adequate research and development, including technology assessment, however, require approaches with more variables and longer time-frames.

Adequate research and technology assessment, unfortunately, often result in a competitive disadvantage in research funding and publishing.

How many interlinkages and knots can you neglect, disrupt or delete from an existing, complex, historically and locally contextualized system before you fall out of the hammock?

Where do we go from here? In many contexts, not only in our one, a new term pops up: „responsible innovation“. It was intensively discussed in an EU Project called RECIPES, Reconciling Innovation and Precaution by Envolvement of Stakeholders. It was an attempt to make a wider reflection onthe new term.

On Innovation: Recent Reports by IPBES, IPCC and UNEP, CBD and WHO on Biodiversity, Climate Change and Environment, focus on sustainable pathways out of these interlinked multiple crises. They all agree that this can only be achieved by systemic, multidimensional, cross-sectoral, interdisciplinary, transdisciplinary and participative approaches. Thus, a new type of innovation is being promoted, which moves beyond mere patentable techno-fixes. The latter remain, of course, influential in the global market competition and make it in the daily news.

- **Responsibility** means the ability, sometimes even obligation, to respond. This may range from personal integrity to voluntary guidelines, and to strict liability and the obligation to provide financial security, including taking insurance. The insurance sector, of course, does not like potential damages of great extent combined with an unknown probability of occurrence. They ask for a high prize or even refuse to insure. This could be an incentive for the risk-takers to apply precaution. The old and very recent debates on the inclusion of liability and redress in the EU supply-chain legislation indicates the importancef Principle 16 in this context.

In addition, involvement of the public on these issues could go far beyond mere top-down awareness-raising, education and information dissemination. It could be very useful and productive, exploring additional aspects and drawing a differentiated picture of „benefits for whom?“ and „damage to whom?“.

IPBES: https://ipbes.net/document-library-catalogue/summary-policymakers-global-assessment-laid-out

IPCC: https://www.ipcc.ch/report/sixth-assessment-report-cycle/

UNEP: https://www.unep.org/resources/making-peace-nature

CBD and WHO on One Health: https://www.cbd.int/health/SOK-biodiversity-en.pdf

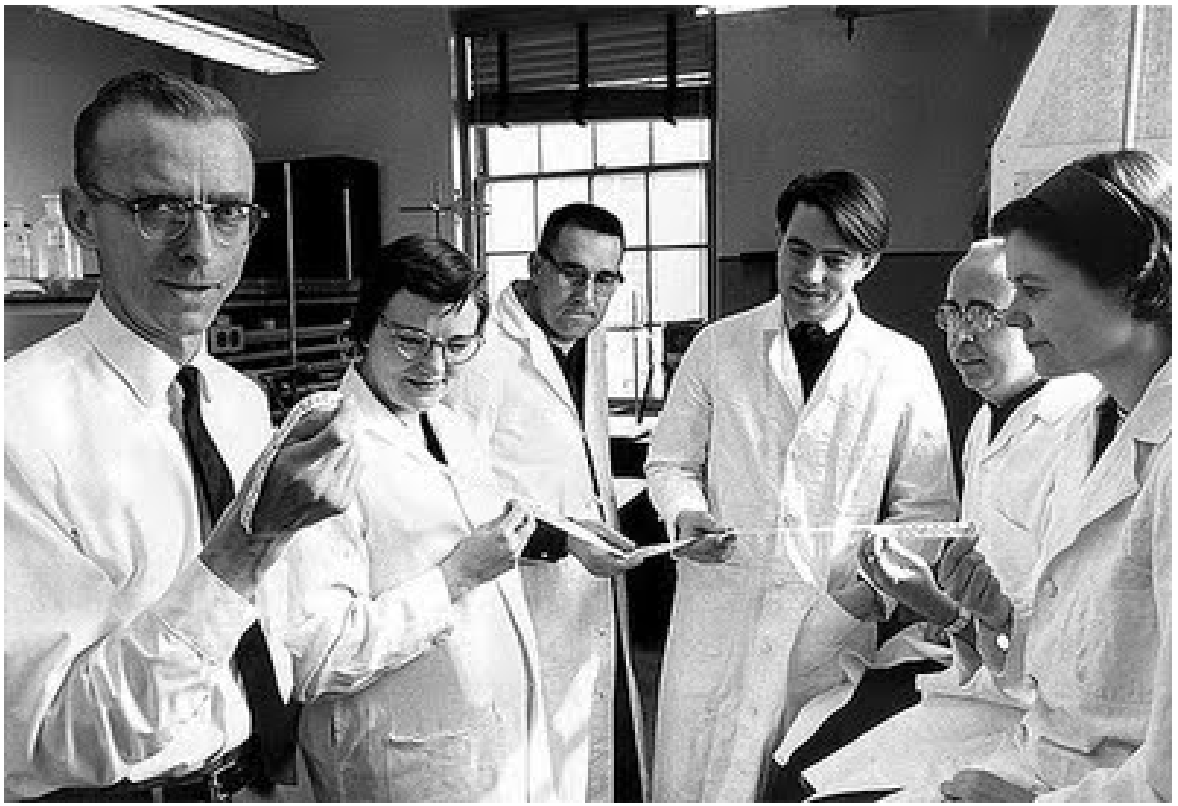
Once a scientific trend has achieved the status „key technology of the 21st century“ or „industrial revolution 4.0“ unbiased assessments may not be carried out any more.

Christine von Weizsäcker: Lacking Scientific Knowledge or Lacking the Wisdom and Culture of Not-Knowing. In: Ad van Dommelen (ed.): Coping with Deliberate Release. The Limits of Risk Assessment, pp. 195-206. Tilburg [etc.]: International Centre for Human and Public Affairs, 1996

.

And now let us complement the term “innovation” with “speed of innovation”

Speedy Science



Speed counts in the competition
for funding, for being the first to publish,
for being the first to apply for a patent,
for being the first linking research to development.
No time to look for wider and complex implications.

Speedy Markets

Speed counts and the winner takes it all.
No time to look at wider implications,
let alone at biodiversity and the obligations of CBD Parties.

Leadership by the fastest process:
Questionable in schools of fish!

(Partially de-brained fish who cannot perceive the surrounding environment and other fish are not only unable to capably swim in the group but become leaders.)

Advisable for international rules ensuring sustainability?

In some areas of technology the introduction of the „next generation product“ and „consecutive generations products“ is much faster than the production of evidence of their impacts on the environment and human health and other concerns.

If a company is asked to stop the use of a washing powder ingredient that – after many years – caused an accumulation of damaging sludge in rivers they may laugh and say that they stopped using it a long time ago. But how about unpleasant surprises with the next ingredients…..

There is often a leadership by the fastest process. It leads to sloppy and narrow scientific assessments, disregard for wider contexts, and also disregard for „slowing down“ elements, such as citizens‘ information and participation in decision making, labour standards, human rights, and the precautionary principle.

Christine von Weizsäcker: Einführungsvortrag. In: Bericht der parlamentarischen Enquête-Kommission betreffend "Technikfolgenabschätzung am Beispiel der Gentechnologie" - Gutachten und Stellungnahmen, Band 3, S. 43 - 49.
Wien: Österreichischer Nationalrat, 1993.

Christine von Weizsäcker: Missachtung der Zeitskalen. Abschied vom Prinzip Versuch-und-Irrtum In: Die Nonstop-Gesellschaft und ihr Preis. Barbara Adam, Karlheinz Geißler und Martin Held (Hrsg.) S. 171-184.
Stuttgart: Hirzel, 1998.

Questions:

- **If the speed of innovation towards market approval outruns the knowledge about its impacts, is a steady pathway of learning still possible?**
- **Is science leaving its culture of „trial and error“ and reaching the realm of „hypotheticality“ where „adventures of the size of the history of humankind“ are being entered with innovation as the new godlike director? How can „humankind“ and its „future generations“be asked?**
- **How can a society with a gigantic well-funded innovation potential on the part of the „ technop-fix tool-makers“, combined with frightening gaps in technology horizon scanning, assessment and monitoring, and also weaknesses in establishing common ground as to societal ends move towards really earning the title „ high-tech society“ with suitable tools to serve its complex ends, based on well-discussed political and legal structures?**

In what a turmoil of terms and concepts, including subsidiarity, prevention, precaution, separation of political powers, democracy, techno-fixes, speed of innovation, human rights, justice, did we enter when just a reflection on „based on sound science“ and „based on the best available scientific knowledge“ was announced?

I think we should thank all ENSSER members who, fully aware of the former, fight patiently, cooperatively and diligently for good wording in multilateral negotiations.

Let us give them a round of applause!