

# **The Future Impact of Environmental Science on Political Strategy**

**Prof. Dr. Klaus Töpfer**

Bundesminister a.D., UNEP Exekutivdirektor a.D., Mitglied des Rates für Nachhaltige  
Entwicklung

Keynote to the 4<sup>th</sup> BMBF Forum for Sustainability “L2L Sustainable Neighbourhood – from  
Lisbon to Leipzig through Research”, May 9<sup>th</sup>, 2007, Leipzig

I am grateful that you give me the opportunity to address this important conference. “From Lisbon to Leipzig” provides a signal that cannot be underrated. I have read in the preparation paper for this conference that it is the aim of this conference „to position sustainability research as an engine for European competitiveness within the Lisbon Agenda”. What a sentence! An engine!

I have no doubt that this is exactly what we need: an engine. We do need a new driving force to increase our sustainability thinking and, by doing so, to increase well-being and competitiveness throughout Europe. But there is more to this. Actually, I think Europe, in these days, needs more than just one single engine. Up to recently EU was in a crisis situation following the failed referenda on the European Constitution in France and the Netherlands in 2005. The so-called "period of reflection" has not brought about a solution that would satisfy all member states.

Now, this period seems to be over. Within the German Presidency, Europe has come to new decisions. A road map for the further treaty process is supposed to end the deadlock. Indeed,

Europe needs to come to grips with the long needed institutional changes. Thus, we will need quite a couple of those engines: Engines for the constitutional process, engines for the financing scheme, and engines for the European social and environmental model.

## I

We currently face a trend towards what I would call an oligopolisation of the world. As opposed to an ever more fragmented world that could only be assessed nation by nation or on the level of regional we now see political blocks of nations entering the global agenda with their issues. Take the Mercosur – the rising common market in Latin America as an example that will once live up to a political strength similar to the one the European Union has now. We should keep in mind that, at the times of Jean Monnet and Roger Schuman, Europe also started out as a joint endeavour of economies as was best expressed by the then Montanunion.

If you take a closer look into the relation of the Bretton Woods financial instruments to the United Nation system and if you look into the ever increasing trend of the globalized private sector my point would be: Whereas major economic trends are globalized, politics are fragmented, or regionalized at best. Worse, environmental politics on the global level are compartmentalized to an extent that makes integrated thinking a far reaching goal, but nothing you would see on a day-to-day basis.

I think what has to stand in the core of those change-engines in Europe is the sustainability issue. The recent decision of the European Council on the climate objectives, biofuels and renewable energies from March this year is proof. The 3 x 20 solutions is a major move, indeed. It asks to increase renewable energies to a 20% market share, to reduce carbon emissions by 20% and to achieve 20% more resource efficiency. This decision is what I hope will turn out to be a tipping point. For both the environmental agenda and the agenda of European competitiveness ambitious and front-running climate goals are engines.

Environmental politics have achieved a lot in Europe since the 1970<sup>th</sup>. But, still, our generation will hand over a planet that we do not use in a way that could be sustained and is suitable for a population of somewhere between 6 and 9 billion people that are putting an end to poverty and increasing life quality.

- Glaciers are retreating; we are “successfully” melting down the permafrost and get the Greenland West Antarctic ice sheets to vanish.
- Our impact on the Arctic and Antarctic ecosystems affects even the polar bear.
- The number of heatwaves, and the warming of rivers and lakes are increasing.
- We are changing the migration patterns of birds and fish.

This all is already happening in the Northern hemisphere. And this is only a fragment of the tremendous impacts climate change has on the social and economic vulnerability of people in Africa, the Small Island and, in general, on people living under the conditions of poverty and an already degraded water and soil resources.

The impacts of climate change will vary regionally, but are very likely to impose a net annual cost, that will increase over time as global temperatures increase. Climate change is about economics as much as it is about the ecology.

That is why we need to set ambitious long-term goals to drastically reduce CO<sup>2</sup> emissions. For the European Union's it is an ambitious goal to reduce carbon emissions up to 20 respectively 30% by 2020. Take the example of Canada and even some of our European neighbours: While others are disavowing their Kyoto commitments and backing off their once proclaimed reductions targets, the European Union is sending the right signal. We have to get serious with greenhouse gas reductions.

I am positive that we even can do better. We can pursue more effective sustainability strategies. And we can deliver more CO<sup>2</sup> reductions than we did in the past. That is exactly where research and development come in as a new driver. Therefore, my sincere thanks go to the host of today's conference. It is innovative to provide this forum. It is good to link the sustainability debate to current research in this field. I expect the interaction between policy, economic and research communities to come up with future research issues and new ways of understanding between the communities. All this will help to better distribute research results, to foster cooperation and to speed innovative processes up.

If you travel the world as I had the honour and the privilege to do in the last nine years you will learn two things:

1. The world is in deep need of exactly what this conference is setting out to achieve. The world needs desperately a new momentum to sustainability research and sustainability initiatives.
2. The world looks out for the European Union to, finally, maximise the effectiveness and impact of research to its renewed Sustainable Development Strategy. In particular the Countries with emerging economies know about the key role of research for sustainable development, and they are carefully watching how we are linking research and stakeholder involvement because they know that this is the key for excellence in producing real world results.

## II

The title of my key note asks me to predict future impacts of environmental science on political strategy. This is a demanding task. It is always difficult to describe what will possibly happen in the future. I feel always reminded of the great dictum by Niels Bohr, the Danish physicist: “Prediction is very difficult, especially about the future.”

However, the good news is that there is another common saying. It defines the term future and it says that future, more often than not, is something that is already there even before we may reckon it at all.

In essence, that is exactly true for the future impact of science on political strategies. What we are looking for is already there. Granted, it is there in small scale, maybe too weak, and clearly in some only emerging state of beginning. And, of course, the impact of sustainability thinking is still somewhere in the margins of an otherwise indifferent mainstream relationship between science and politics.

What about the political impact of environmental science? In short, I am advocating more scientific impact via

- a) more r+d output in terms of quantities, and
- b) increased quality of sustainability science.

Why do we need more research money, more researchers, more programmes? My point is that the problems and issues we are talking about will not disappear or weaken by themselves. On the contrary, they will stay right in our face, and they are very likely to increase and to challenge our society. More and more it becomes obvious that global change is challenging the way we are consuming, travelling, and trading commodities and products, and the way we are thinking and communicating. All that will happen in conflict with vested interests. And it will demand new and innovative ways of transitional thinking and researching. Take the example of the challenging task to change our consumption and production patterns. Scientific contributions to this endeavour are most welcome. However, they have to be brought forward in due time to be effective. That means we need scientific evidence and scientifically based concepts to change production and consumption patterns well before those patterns have manifested in vested interests.

With increasing environmental damage in the future through our production and consumption patterns we will have to increase in-depth analysis into effects, drivers and responses, adaptation and abatement:

With the Millennium Development Goals (MDGs) the United Nations addressed major requirements for a globally sustainable future which the Johannesburg “Plan of Implementation” underlined in 2002. The MDG range from halving extreme poverty to halting the spread of HIV/AIDS, providing universal primary education, and ensuring environmental sustainability. These targets are to be achieved by 2015 which practically is the day after tomorrow. They have galvanized unprecedented efforts by the UN and on states level. But I can’t see how our current business-as-usual approach will successfully come to meet these requirements. On the contrary, economic growth is outperforming our nature capital, on the global level. The devastating political and social result of this can nowhere else be seen more clearly than in Africa, be it the failed states, or be it the decrease of life expectancy people over there are facing in large areas.

Also in Germany, we are far from addressing the sustainability challenge properly although we definitely have made some achievements in nature protection and environmental quality. We do not see any foam floating on Germany’s rivers. We improved surface water quality drastically. The salmon is coming back, as is the wolf because of the large-scale biosphere reserves and national parks. We finally stopped the acid rain and we improved chemical hazards abatement.

This was achieved by political decisions that did not wait for a complete scientific consensus on causes, impacts, and effects. In particular in environmental policies, politicians have to come up with decisions under uncertainties. The example of the extinction of species and the devastation of soils show why this is. If we would want to wait until science presents full certainty our issues would simply be gone and we would have run out of options to safeguard the environment.

As I can tell from my own experience as an Environmental Minister science can sometimes be very seductive. You always find scientist who pretend that it is too early to take action. They want to continue research and for them it is a horror to hear a politician saying: Even if our knowledge is incomplete, evidence is there to take action. This statement can spoil research applications. And there are, of course, politicians who take the message of incomplete knowledge as an alibi for inaction.

Therefore, it was one of the most outstanding efforts of the 1992 World Conference in Rio de Janeiro that we succeeded in establishing the precautionary principle in paragraph 15 of the Rio Agenda. With the implementation of the precautionary principle people began to understand that the scientific evidence that we need has to take probabilities into account, has to identify and assess the confidentiality of its findings, and finally has to improve communication with stakeholders and society.

While the precautionary principle required this new quality of science in dealing with uncertainties sustainability policies require science to come up with an extra skill: the integration of knowledge.

“Integration” is exactly my key point today. I do not want to be misunderstood: Integration is in no way opposed to disciplinary excellence. We need scientific excellence drilling deep into the issues, with all scientific methods that sometimes seem a little bit reductionist, at least with the eyes of environmental policies. I am very much in favour of the recent initiatives to encourage scientific excellence in Germany. But at the same moment, we also need scientific work that puts the picture together and delivers integrated solutions. Otherwise our scientific proposals will turn out not being sustainable. The current run into biomass energies might serve as an example. Some activist biomass energies seem to approve biomass as a silver bullet for climate change policies not noticing that biomass abates CO<sub>2</sub> emissions by increasing the greenhouse relevance of laughing gas emissions (N<sub>2</sub>O) which has a comparably

even higher climate impact at the same time. I am worried by the greenhouse impact of N<sub>2</sub>O that we will see increasing with the growing renewable fuel supply through bio energies. The same is true for greenhouse impact of methane from livestock.

There are so-called “no regret” measures for decreasing CO<sub>2</sub> emissions. No regret means that you will have to reduce carbon emissions anyway by way of replacing outdated industries or changing into new forms of energy supply. However, calculations of harvesting quota in greenhouse gases have to be integrative and comprehensive in order to take sometimes hidden side effects into account or they would not make any sense.

The general lack of integrated solutions is instantly clear when you look at soils. In my mind, soils are the forgotten environmental compartment. That is because in soils all other environmental compartments integrate in ecosystems. However, we seem to continue to loose soil and habitats that are the basis for biodiversity. The land consumption for settlement and urban sprawl is persistently too high. So far, we did not reach a turnaround point.

Compared to the International Convention on Climate the International Convention on Desertification and Soils has started out with no relevant financing mechanism and with no integration link to other international environmental regimes. Still today, this deficit hinders soil protection policies to be integrated and effective.

Integration of single-issue driven solutions is also needed in terms of the environmental impacts by new materials that we use in information and communication technologies. And it is clearly required when we look into our mobility infrastructure. Decentralized energy feed-in into the grid and new intermodal mobility options provide for new infrastructure concepts, in particular when applied to regions where demographic change leads to a decrease in population.

Historically, science and engineering is an asset for Germany. There is no doubt. After all, we are still a world leader in environmental R + D. I had a look into the abstracts provided on this conference’s website. My congratulation to the authors and to their research teams: The topics are well chosen. Almost all relevant fields of interest are covered. This should encourage the science organisations to continue efforts and investments into sustainability research, also reaching out to globally relevant issues.

The example of China shows us a paradigm for the emerging economies in the world. The emerging prosperity is challenged by environmental losses. China is the first country that mustered the braveness to come up with a “Green GDP”. This is a calculation of the gross national product that subtracts environmental losses from the Nation’s welfare. It shows: Ecosystem losses outscore prosperity gains.

I know from many discussions with Chinese politicians that there are dedicated and well-educated people over there. They are really working hard to come up with some new and bright ideas about environmental policies. And they are watching out for what we do here in Germany. To give you only one example: China is about to foster recycling schemes and even to introduce principles of a circular economy. And of course, they looked intensively into the German role model of the Kreislaufwirtschaftsgesetz. They want to know more about our lessons learnt and how would we today update our concept of recycling. And then, instead of high level strategic debate and scientific up-to-date research into technologies and social innovation all they get to know is some political filibustering and arm-wrenching about what we call the “Dosenpfand”. This is not what they expect us to do.

It is the same with the topic of urban development. In general, German engineering is known for two things: The technological skill and the ability to integrate sectoral and single-issue techniques into an integrated solution. But in the field of environmental science we do not live up to those expectations. Take the example of housing and urban development: Sectoral innovative technologies for energy efficient building material, air conditioning, solar heating, geothermal systems are impressive. Now we have to integrate them into an overall greening of urban design. We have to deliver the embedded engineering.

The same is true for other topics. I will raise only one example. The update report about the German Sustainable Development Indicators was recently published. It tells us a bizarre story about the organic farming:

- The number of purchases and amounts spent on these products is continually rising. In 2006, private households increased their expenditure on organic food products by around 17% compared with the year before; with the saturation point is still a long way away in the organic food market, according to the survey carried out by the Gesellschaft für Konsumforschung.

- This is good news. What bewilders me is the following: With the increase in demand on fruit, vegetables, potatoes, eggs and dairy products one would expect the organic farming area to increase. But this is not the case. While the consumption of organic food products is booming, there is no significant increase of the area of organic farming in Germany. While this area increased from 1994 to 2002 from 1.6 to 4.0%, from 2002 to 2005 there is only a moderate increase to 4.7%. Obviously, there is no carry-over from the consumption boom to the production in Germany.

For a research community, this raises quite a few questions. What about our food chain management? How to translate demand side signals into incentives for the production? How to translate market signals into spatial planning?

#### IV

As mentioned above I advocate the qualitative side of sustainability science. We can build on some very good examples. For the Stockholm Conference on the Human Environment in 1972, the International Council for Science contributed a major report on global environmental monitoring at the request of Maurice Strong, the Secretary-General of the Conference. For the UN Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, ICSU served as special science advisor to Maurice Strong. In preparation for the Rio-Summit, ICSU organized a conference on an “Agenda of Science for Environment and Development into the 21st Century”. The document became well known as ASCEND21. It helped focus the efforts of the science community on issues related to science and sustainability, but ICSU did not have a formal role in the Rio de Janeiro Conference. A major difference at the Johannesburg Summit was a better involvement of the research community.

Thus, we already have some starting point. With Rio it became clear that sustainability is an integrative and innovative concept. With ASCEND21 it became clear that sustainability strategies give way for a new framing of research concepts and interpreting research results. The concept calls for the conceptualisation of research items and methods beyond disciplinary limitations.

Research into sustainability has not yet captured the attention of many senior politicians. And it is also true that sustainability research is not accepted enthusiastically by mainstream

science. Rather, it lies at the foot of the hill. To make it part of the mainstream science some say would be an uphill battle. But I see some encouraging moves.

It is good to have the Forschungsprogramm Nachhaltigkeit FONA. It is good to have the Darwin Initiative in the UK, for example. It is good to have some well-known global cross-cutting scientific consensus building mechanisms that already have an input into policy-making. I will only mention the Millennium Ecosystem Assessment and the Intergovernmental Panel on Climate Change.

In 2000 the UN commissioned the fundamental interdisciplinary research programme “Millennium Ecosystem Assessment (MA)”. The MA assesses the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems. Its focus on ecosystem services and their link to human well-being and development needs is unique. Thus, the assessments synthesize information that has previously technically been available, but has not been usable politically.

The assessment built a consensus view of a large interdisciplinary body. The examination and integration of existing information provides new insights that can only emerge when linked and assessed together. Synthesizing contributes to political decision making.

The Intergovernmental Panel on Climate Change (IPCC) assesses trends in the physical and biological environment and their relationship to climate changes. IPCC builds on previously available studies. It is a hybrid, with all consequences of hybrids. It was first set up to define and present the state of knowledge. Defining the state of the art is nothing extraordinary in science because that is what scientists are doing all the time when assessing new research approaches. But for the first time ever, IPCC is doing this on a global level, with a scientific topic that is highly complex, and in an inclusive and transparent way. Later on, the working groups on impacts and consequences and a third one on action and policy options were added. All of them work under the overarching motto that IPCC is policy relevant, but not policy prescriptive.

IPCC has achieved high political influence and forms political processes. This influence results from three crucial governance elements:

- Advice is requested by politicians.
- As an intergovernmental panel scientist are obliged to negotiate their findings with governmental representatives to jointly agree a summary for decision makers. This task, sometimes seen as awkward, time consuming and watering down the findings, makes sure that there is a political response to scientific evidence at all. Besides, it is the best guaranty IPCC could have to make news and to show up in headlines.
- IPCC in itself is a new model of providing scientific advice for politicians. As opposed to Commissions with a restricted number of selected mandated members IPCC applies the rules of inner-scientific quality assurance and debate of findings via the review system. Thus, IPCC is building scientific consensus by scientific methods that are transparent and reliable, and that involve as much scientist as possible and builds ownership.

Although every now and then, some scientists from outside question the consensus of the IPCC the baseline findings of man-made influence on climate of the Fourth Assessment Report is not subjected to any kind of doubts. IPCC shows the effectiveness and well-functioning of interdisciplinary work. It also underlines how useful it is to establish long-term research programmes and allow for continuity of research. It displays integration of scientific thinking and economic and policy related arguments.

I think the world would be a better place when the science community had some more of these scientific integration schemes. Undoubtedly, it would make a lot of sense to tackle the problems of soil losses and land degradation, biodiversity or marine biology and fishery in a similar approach.

## V

Most valuable, and maybe even more valuable than all programmes and research platforms, is what I perceive as a deep yearning among young scientists to go for the big pictures and to seek answers to unsustainable trends in ecology, economy and the social welfare. They are asking the right questions. They are motivated to look into highly complex matters. They have no doubts that they will carry out reductionist research methods singling out cause – effect –

relations. Their yearning is to put the puzzle together – as an interdisciplinary task. This curiosity is our asset for the future of scientific thinking.

We need excellence in all aspects. Science needs to go beyond our current approaches to find adequate responses to our collective choices. Specialisation is just as necessary to come up with innovation as interdisciplinary and transdisciplinary synthesis is. Good science is participatory science in order to generate the benchmarks for collective action or inaction.

We have to overcome structural obstacles to interdisciplinary and transdisciplinary research. We need to address the co-existence of specialised and inter- / transdisciplinary research.

It is good to have the German High-Tech Strategy. It is a national strategy for innovation policy. It is good to speed up the dissemination of research results into products, processes, and services. Creating platforms for dialogue between experts from government, industry, civil society and science is exactly what we need to enhance the German performance in the most important scientific fields such as energy and resource efficiency, the cleaning up of fossil energy supply, renewable energies, and environmental technology.

I would like to encourage everyone in the Ministry as well as in the science community to go along this way and to completely link up with the challenge of producing benchmarks to our future.

Sustainability is a surprisingly good method of framing research problems, searching solutions, and putting together what otherwise would stay mere sectoral approaches.

Together, we have to improve our German Strategy for Sustainable Development which will be relaunched next year. National Sustainability Strategies are built around targets, timetables and indicators that provide excellent opportunities for science to hook into and to provide impact on the questions at hand.

In his recommendations to the Federal Chancellery, the German Council for Sustainable Development has made reference to the current state of research. We have called upon branching out research policies and enhancing research performance.

To conclude my expectations on science and sustainability, let me point out that science is as much at the heart of good policy making for sustainable development as it is for any other policy making. Providing evidence for decision-making helps us to find new policy solutions and to identify and tackle future issues. I believe that good science is crucial in maintaining a high quality of the Sustainability Strategy for Germany.

It was the British Prime Minister Winston Spencer Churchill who said “Let our advance worrying become advance thinking and planning.” Indeed, with a strategy of targets, timetables and policies we can lead our way to future and we can – and we must – encourage research and thinking to provide us with the appropriate solutions.

After having talked so much about science, excellence and other highly intellectual schemes to produce discoveries, I would like to end with a little hint as to the real life. I borrowed this from Albert Einstein: “Sometimes, the intellect has little to do on the road to discovery. There comes a leap in consciousness, call it intuition or what you will, and the solution comes to you and you don't know how or why.”