

Editorial

Gamblers

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Forest die-back, soil contamination, ozone depletion, and anthropogenic climate change share some common features: Full reaction to disturbances can only be seen after many years, their regional effect patterns are not clearly related to the pattern of emissions, and all these syndroms are strongly interrelated. Research – often stimulated by fear of economic consequences – frequently starts too late, and a natural background can no longer be established. Nevertheless, politicians ask for immediate advice early in research programmes. As they are used to dealing with representatives of exact natural sciences, they only accept direct cause-effect relationships which they do not, will not and cannot get. Thus a multilateral strategy and measures to combat environmental problems are often postponed by politicians and managers until researchers deliver “hard” numbers, which are never available early enough. I call this behaviour of our decision makers “gambling with future generations”. Some examples will show why.

First example: No Healing for Forests

We know that the acidification of soils, photochemical smog, weather extremes like warm and dry summers, new pests, ill-adapted species, and eutrophication all contribute to forest die-back. We do not know which species will suffer strongest where, but we know that about 60 percent of all sixty-year-old trees (youngsters with respect to their potential age of hundreds of years) suffer in Germany. The percentage near death will no longer be counted after their removal, but new ones will enter this stage.

Cars without catalytic converters are still common. Some ten kilograms of nitrogen compounds are deposited per year per hectare as a consequence of nitrogen-oxides emission from traffic and of ammonium emission from industrialized animal husbandry. Sulfur rich lignite is still burnt without scrubbers in many countries, even after 15 years of modest international treaties for reduction. Refueling of cars is in most countries without recovering evaporated hydrocarbons. Cars with catalytic converters are not properly controlled to ascertain their proper functioning.

Second example: Poisoning after Decades

The contamination of soils with trace-metals is a convincing example for the complexity of element cycles in natural ecosystems. We emit, for instance, mercury mostly as vapour from stacks of coal fired power plants, waste incineration, and some industries. By long-range transport and air-

chemistry processes these mercury compounds will be deposited hundreds of kilometers away from the sources, where concentration increases in soils as long as the leakage into surface and ground waters is smaller than the deposition rate. Since the mobilisation strongly depends on soil parameters (e.g. pH), it may well happen that fish in more Scandinavian lakes are no longer edible decades after the peak deposition rate, in the eighties, of central European mercury into Swedish soils.

Third example: Wait and See

Although it is clear that an enhanced greenhouse effect can change global climate, it is not at all clear, for instance, whether southern Bavaria will have increased soil moisture as a consequence of global warming or whether agriculture will still be possible as today in the Nile delta. The delay of climate change by decades following a radiation budget change due to the high heat capacity of the ocean will never clearly show the full result of disturbances early enough in direct measurements. Also, models to forecast local effects may never be accurate enough.

The UN Climate Convention, enacted on 21st of March 1994, has the challenging goal of stabilizing greenhouse-gas concentrations. However, commitments to reach this by 2050 do not exist; even a global stabilization of emissions at 1990 levels is far outside present policies and thus nearly follows the principle: Wait and See.

The Way to Proceed

The correct way to reduce the threat to our environment would be to

- adopt the precautionary principle,
- take the worst case scenario, i.e. the most sensitive possible reaction of natural systems established by international science teams as the scenario to derive emission reductions,
- formulate world-wide or continent-wide commitments and
- implement them under international control.

Since this was possible for stratospheric ozone depletion within the Montreal Protocol of the Vienna Convention it should also be within reach for the above mentioned examples.