Science and policy: the 21 points of Friedrich Duerrenmatt

Ralph Dum, European Forum Alpbach, 22nd August 2009

Plenary session on 'integrated risk policies for global systems at risk'

A recent memorandum by the Obama administration emphasizes the role of science to face the most urgent challenges— economic recovery, health care, and the ecological crisis. It states that "sound science should inform sound policies".

Often, sound scientific modelling indeed informs policies. This is the case, whenever prediction is possible, recommended actions clear, and resulting policies non-controversial. A good example is pandemic planning in which simulations help officials decide when to close schools or how best to mount a vaccination campaign. Modelling of natural or technological hazards has repeatedly helped identify serious environmental risks before the worst effects became apparent (seethe timely measures to reduce the ozone hole).

However, neither the science nor the policy could have been possibly sound in the events that led to the current financial crisis! What went wrong?

We have to acknowledge that most of the time science input alone cannot help decide whether to prefer one line of action rather than another. This is certainly true for European fishery policies, but also for the abortion debate and even the climate change debate. Here, scientists become involuntary actors in a complex process including policy makers, business interests, and the citizen. Trust -or lack of it - in science and in science-based policies plays a crucial role. The breakdown of trust both in policy and in the economics of global finance was certainly a trigger of the current financial crisis. To merit trust, scientists have to act fully transparent and try to understand what additional science input would change the debate over a proposed regulatory policy. In what ways would this input contribute or change the public debate?

In 1962, at the climax of the cold war, Friedrich Duerrenmatt, a Swiss playwright, formulated 21 points in an appendix to his play 'Die Physiker'. These points can serve even today as a manifesto on the relation between scientific insight and societal action.

The first three points of Duerrenmatt are:
1. I do not start out with a thesis – a statement or theory to be proven - but with a story
2. If you start out with a story you must think it through to its conclusion.
3. A story has been thought through when it has taken its worst possible turn.

The absence of clear scientific conclusions is often seen as reason not to act: *'We have*

not yet shown that....' and '*therefore it is urgent to wait'*. A telling example is the non-acting that led to the disaster caused by hurricane Katrina. Had someone thought the story through to its worst possible turn – breaking of the dykes – the necessary actions would have been taken.

Stories often are not only of the essence to relate facts to a larger public, often stories create facts. In the current and previous financial crisis it was not clear whether facts resulted in a financial crisis or whether the drop in confidence that was due to various stories on lack of creditworthiness of banks made the crisis a fact.

The scientific consensus within the IPCC framework made the existence of human-caused global warming compelling. Now the focus is shifting towards studying its impact and I contend that only stories will induce necessary action. The Stern report has helped initiate an economic story line by looking at the consequences of different emission mitigation policies on growth of GDP. But is GDP all that matters? Thinking the story through to its end would inevitably have to link global warming to elimination of animal and plant species, to human suffering, to poverty, and to social upheaval. Far from undue pessimism such stories could open new perspectives for the ways we deal with this crisis that is ecological as much as social. We need integrated policies of which mitigation of emissions is only one aspect.

In his next points, Duerrenmatt correctly identifies the non-foreseeable as a main driver of action:
4. The worst possible turn is not foreseeable. It occurs by accident.
8. The more human beings proceed by plan the more they may be hit by accident.

The invention of risk insurance was a milestone in Western civilization. Insurance is now so deeply rooted in our thinking that we are convinced it allows us to tame all risk and even can replace planning. But as recent catastrophes cause more and more damage -as well-recorded by the insurance industry – we realize that we are increasingly vulnerable to natural and technological hazards. The 2004 tsunami swept away costal settlements with such devastating ease that 'tsunami' made it to the general vocabulary. Today, we talk of financial tsunamis. These tsunamis sweep away and ridicule risk planning in banks with equal ease.

We no longer care to distinguish between the improbable and the impossible. A telling example is derivative securities in the financial sector. The highly sophisticated mathematical models to assess risk clearly underestimate highly disruptive low frequency events; this has left financial institutions excessively exposed and led straight into the current financial crisis. Risk models in economics need to learn to respect and plan for these rare extreme events. Such disruptive events cannot be predicted in time but can be predicted to occur. The underlying

story is reminiscent of the mythical James Dean movie where all the adolescents - most traders are adolescents - drove towards a cliff and the last to break won. Traders attempt to maximise their gains by being 'the last one to break'.

The next points of FD:
16. The content of physics is the concern of physicists, its effect the concern of everybody.
(You are free to replace physics by economics, technology, biotechnology, etc)
17. What concerns everyone can only be resolved by everyone.
18. Attempts of individuals to resolve alone what concerns everyone are doomed to fail.

This is what this plenary is all about,'Integrated policies for global systems at risk': risks are global – the whole world is concerned; global risks collectively weave a menacing web of systemic risks. We can no longer tackle these risks separately and need to propose integrated solutions.

No nation alone can cope with the mitigation polices necessary to reduce global warming, no government department alone can put in place the necessary adaptation measures to the by now inevitable increase in temperature. To some extent, modern IT – the Internet - might allow new forms of integrated societal and policy actions (see social online networks or Twitter) that already now prove to be highly effective means of citizen involvement.

Globalization induced pervasive interdependencies. For example, recent subsides for bio fuel in US caused a worldwide food crisis and riots in Asia due to unexpected interdependencies among energy supply and food resources on the world market. Interdependencies between banks world-wide led to their collective exposure in the current crisis and to risk correlations no model took into account.

Why is there still only weak integration between the proposed solutions? National priorities keep us from acting globally; jealousies between government departments hinder integrated solutions; rigid university departments prevent multidisciplinary holistic studies. To some extent, modern IT – the Internet - might allow new forms of integrated societal and policy actions (see social online networks or Twitter).

Duerrenmatt's 21st and last point:
21. Drama can induce the spectator to face reality, but cannot compel him to master it.

We might arrive at a consensus on 'what we should be doing'. But will we do it? There is rarely a straightforward line of policy actions from understanding what is needed to doing what is needed. No readymade recipe for success exists in policy or

-as Hubert Vedrine put it – 'Policy is not Nescafe'.

Nor are models oracles. Modelling is not supposed to predict the course of events, it is supposed to help us decide on the right actions.

Modellers engaging in societal action are bound by the 'Principle of insufficient cause '(Prinzip des unzureichenden Grundes) that Robert Musil invokes in his MOE (man without qualities). Events in society can emerge spontaneously from a situation that does not privilege occurrence of these events in any causal way.

Or as Ulrich puts it in his answer to director Fischl (incidentally from Lloyds bank!) in answer to the latter's question on the nature of the 'real': ' *I can assure you none of us knows what is 'reality' but I can assure you that it is about to happen*'.

Rather than attempting to predict the course of events, the modeler will try to analyze patterns in societal processes that facilitate or impede collective action.

We need a concerted effort towards a science of sustainable systems that includes radically novel methods in economy and novel methods to understand the deep connections between ecological and social systems. Such a science cannot be developed in isolation and must include means to communicate with society. The modeller will analyze patterns in societal processes that facilitate or impede collective action. For that we will need a 'mathematics of social entities' elucidating concepts like for instance prisoners dilemma or tragedy of the commons. It will build on recent results from science of complex systems that puts system dynamic aspects in the center, like self-organization or path dependency of processes.

GSDP, a network of scientists funded by my unit in the EC. GSDP is trying to improve the dialogue between policy, society and science on global systems at risk. It is working on a manifesto reminiscent of the one of FD but adapted to 21st century challenges, in particular the sustainability challenges that we face. The following presentations will give you an idea of the scientific issues addressed by this network.

Appendix: Dürrenmatt's 21 Points on relation of science and societal decisions

1. I don't start out with a thesis but with a story.
2. If you start out with a story you must think it through to its conclusion.
3. A story has been thought through when it has taken its worst possible turn.
4. The worst possible turn is not foreseeable. It occurs by accident.
5. The art of the playwright consists in employing, to the most effective degree possible, accident within the action.
6. The carriers of dramatic action are human beings.
7. Accident in dramatic action consists in when/where who happens to meet whom.
8. The more human beings proceed by plan the more effectively they may be hit by

accident.
9. Human beings proceeding by plan wish to reach a specific goal. They are most severely hit by accident when through it they reach the opposite of their goal: the very thing they feared, they sought to avoid (i.e. Oedipus).

10. Such a story, though it is grotesque, is not absurd (contrary to meaning).
11. It is paradoxical.
12. Playwrights, no less than logicians, are unable to avoid the paradoxical.
13. Physicists, no less than logicians, are unable to avoid the paradoxical.
14. A drama about physicists must be paradoxical.
15. It cannot have as its goal the content of physics, but its effect.
16. The content of physics is the concern of physicists, its effect the concern of all.
17. What concerns everyone can only be resolved by everyone.
18. Each attempt of an individual to resolve for himself what is the concern of everyone is doomed to fail.
19. Within the paradoxical appears reality.
20. He who confronts the paradoxical exposes himself to reality.
21. Drama can dupe the spectator into exposing himself to reality, but cannot compel him to withstand it or even to master it.