From conflicts to solutions. The role of science in Dutch coastal planning issues

Over the past millennia, humans have been a decisive geological force in shaping the Dutch coast, which is probably the most engineered coast in the world. 'Natural' reference conditions for the coastal ecosystem, when defined as the condition without human influence, are impossible to specify for this coast, as the time scales of slow geological forces (e.g. relative sea level rise) and human influence are comparable. Moreover, rapid global change (increased rates of sea level rise, invasive species, temperature changes) is expected to push the ecosystem out of its present state in the near future.

Nevertheless, there is a strong urge in society to 'restore', or at least rehabilitate natural values in the Dutch coastal ecosystem. This results in societal conflicts on the current use and the current spatial organization of the coast. Examples are conflicts about (shellfish) fisheries in the Wadden Sea, dredging in the Westerschelde, harbor expansion in the Rotterdam coastal area. The paradox of this will to 'restore nature' in a fundamentally unnatural coastal setting helps to identify this urge as a reflection of changing value systems in society. I will argue that, despite its name, the urge for 'nature restoration' does not aim at reducing the degree of coastal engineering, but to redirect it towards different goals, serving different values. I will also argue that this reflects changes in power distribution in society.

For the scientific advice on these conflicts, the lack of clearly definable 'reference' conditions or restoration targets is a serious limitation. Lacking objective criteria, scientific advice is very likely to be a reflection of values shared by the researchers, who thereby are liable to become a party in the debate rather than a referee. Based on this experience, a number of guidelines for scientific advice can be derived. I will plea, firstly, for a much more explicit and transparent statement of underlying value systems by the parties involved, including and foremost also the scientists. Secondly, I will argue that 'effect assessments' of different kinds of ecosystem use are often misdirected and tend to deepen rather than solve conflicts; scientific advice therefore needs to be future-directed rather than retrospective. Thirdly, I will emphasize that (spatial) scale mismatches between societal drivers and pressures on the one hand, and governance structures on the other hand easily lead to intractable problems; the existence of suitable governance structures should be an essential aspect of scientific advice.

Finally, I will try to generalize from these coastal planning examples to the much wider problem of ecosystem-based management of the sea.