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Note by

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Science and technology are essential for the continued survival of humankind and to address the problems created for this by humans and nature. Many of these problems require complex solutions that involve political decision-making and cooperation between the various scientific disciplines working on the problems. To some extent, this is at odds with the trend towards the differentiation of existing scientific disciplines into ever more specialised sub-disciplines.

Research is now frequently triggered by societal needs and to a lesser extent by scientific curiosity. The problems addressed are usually urgent and cannot wait for scientifically validated, "sound" results. Projects have to cope with uncertain, controversial or disputed knowledge or in some cases with lack of knowledge or non-knowledge. In such circumstances, it is difficult for decision makers to know which experts to trust. Solutions proposed by scientists are perceived as being biased by the interest of these actors to secure funding for their own endeavours. There is thus a need for unbiased, high-quality scientific advice.

The attitudes of decision-makers and of scientists towards non-scientific knowledge generated by "ordinary people" in real-life situations have recently also undergone change. In the past, attitudes of lay persons towards technology were frequently dismissed as being due to lack of information and knowledge, in particular is such attitudes were perceived as "negative" and as a barrier to the implementation and application of what was, in the opinion of most scientists in the area concerned, a beneficial technology. The increasing number of crises and catastrophes related to science and technology has led to awareness on the part of decision makers of the contingent nature of science. It has also become apparent that critical or cautious attitudes towards science and technology are frequently displayed by well-informed lay-persons and that the knowledge underlying such attitudes should be considered in decision-making as well as the various existing scientific opinions. The usefulness of results is a major criterion for the quality of research, and this is judged by lay persons rather than experts.

Scientific advice is increasingly organised as a process. The aim of the process is to bring together the stakeholders, including the proponents of various scientific positions, and to feed their positions and opinions into the decision-making process on the problem forming the subject of the project.

Most science is still organised in the disciplinary structures which traditionally characterise universities. The significance of interdisciplinary research has, however, been recognised by decision makers, for example in the shape of the "precautionary principle" or in the debate on "science and governance" at the EU level. There obviously is an interest in being able to assess the quality of the work leading to such results to decide on the one hand, on the ways in which these results may be considered in decision-making, and, on the other hand, whether to commission further work of a similar nature.

Possible criteria to measure the quality of the work and to learn lessons for the organisation of further work of this nature include:

- Scientific quality – it is simple enough to measure scientific quality in the standard terms of scientific disciplines, but is this adequate? The goal of projects of the type we are talking about is seldom to produce particularly new scientific results, but to combine knowledge already

existing into solutions to pressing societal problems. How should such solutions be assessed against other possible alternatives?

- The treatment of uncertain or lacking knowledge – there are several ways of dealing with this type of knowledge, for instance assuming the "worst case", or that certain hypotheses are indeed true. But what is the adequate treatment under which circumstances?

- The consideration of non-scientific knowledge – is the quality of this type of knowledge to be assessed and if so, by whom and by which standards? Or is the measure the range of non-scientific knowledge exposed by the project, or the treatment of this knowledge in the project? Is it simply something to be registered, or does it actively flow into the solutions to the problems concerned?

- The organisation of the process, in particular of interactions between the various scientific and non-scientific actors, synergies created by the process – do the actors in the problem area actually enter into a discourse with each other and understand each others' positions better as a result of the project – or do they act in parallel and the task of the project is to compile the various viewpoints for a decision-maker at some distance to the project?

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