The theme of my address: "The right to know and the means of taking action" has been very well handled indeed in the remarkable report published by the European Environmental Agency entitled "Late lessons from early warnings: the precautionary principle: 1896-2000".

Accurate information concerning the risks is available, we need to know what prevents it from being widely circulated and why the right decisions are not being taken in time.

I – Exercising the right to know

The problem does not really lie with the right to know, which has been fully acknowledged by the Aarhus Convention and various European Union treaties and directives, it lies with the use made of this right.

In order to reflect on this subject, we need to examine questions such as the field of knowledge, the way in which scientific debate is organized, and communication.

A – What kind of knowledge is involved?

With regard to knowledge, it seems necessary to distinguish between two different types of information, although obviously there are interactions between the two types. Firstly, there is knowledge of demonstrable facts or situations (such as the deterioration of natural resources, the presence of pollutants, the emergence of warning signs concerning public health), and secondly there is scientific knowledge, namely the capacity to understand the causes of known phenomena or potential risks.

With regard to this point, the quantitative assessment and monitoring of various milieus is a matter of priority: this will make it possible to evaluate the quality of the various public policies introduced and their effectiveness. Thereafter, the introduction of a research and surveillance system to enable early signs of potential risk to be detected as soon as possible, although costly, would give an extremely solid and reliable body of information on which to base assessments which would reveal whether or not new regulations were necessary.

Such monitoring and surveillance must obviously be based on and rounded out by serious and regular evaluation of any change in the various milieus, which will in turn entail an evaluation of the various public policies (or private sector policies), that have been introduced.

Monitoring will undoubtedly call for means; it may well also provide an opportunity to call into question various special hypotheses in order to throw light on shadowy areas linked to the conditions taken into consideration when evaluating an industrial process. For example halogenated hydrocarbons, which were not taken into account in 1985, have now been taken into account following the results of an experiment which had a totally different objective.

But this first type of knowledge cannot be separated from the second: scientific knowledge.

With regard to this, the scientistic drift noted throughout the whole of the 20th century, and unfortunately still observable today, has resulted in deliberate neglect of the question of scientific ignorance, and a desire to establish a rule to the effect that absence of negative proof constitutes proof of the absence of negative effect.

This is of course far from the case, which is all the more true insofar as, unfortunately, in many instances the initial difficulty lies in having studies and research carried out that would enable various uncertainties to be eliminated. The example of genetically modified organisms and their effects on public health is almost certainly the best illustration of this at the present time.

But what is currently happening in the case of GMOs happened earlier in the case of BSE.

As is very pertinently noted in the EEA's report, the refusal to take the layman's knowledge, as distinct from expert knowledge, into account – the case of asbestos is probably the most emblematic example of this attitude – inevitably reduces the chances of noting warning signals and understanding their significance; it also means that opportunities to introduce corrective measures are lost.

The compartmentalization of knowledge is also a major obstacle to acquiring knowledge; here, again, the way in which BSE was handled serves as an example. It was originally seen as a solely veterinary problem, and the possibility that human health might be involved was totally disregarded, because the approach was based on the then current belief that the different species were divided from one another by an impenetrable barrier.

But the question is clearly not just concerned with knowledge, it also concerns the way in which scientific debate is organized and how the results of such debate are communicated.

B -Scientific debate

First and foremost, this extremely delicate subject concerns the question of "experts".

The tendency of "official" science, which often has extremely close financial links with major economic interests, to deny warning signs and the problems they raise, makes it very difficult to organize an honest, objective framework for upstream scientific debate. Accordingly we must first consider the experts, their degree of independence and their obligation to encourage debate.

The obligation to declare an interest, if any, and ensure transparency in the handling of any clash of interests, affords an initial guarantee, but not an adequate guarantee. There is also the question of protecting those who raise the alarm, and the obligation on the part of public bodies to examine alerts and justify the way in which they have been handled.

Furthermore, the communication of existing information is essential. It is also essential to revise the concept of trade secrets where these affect human health and the environment. For example, at the present time it has been impossible to organize

scientific debate on GMOs because the major agricultural seed companies shelter behind the legislation on trade secrets to justify their refusal to communicate the results of studies conducted on animals, which are obviously crucial to any genuine examination of this subject.

Other players, including those from society as a whole, should also be invited to take part in scientific debate.

Conferences held to explore the possibilities of reaching a consensus, workshops and strategic commissions are other ways of furthering scientific debate.

But we have to avoid "analysing the situation to the point of paralysis" or debate which seeks to stimulate scientific controversy on situations which are now incontrovertible.

For example, one must query the conditions under which the toxicity of tobacco is still considered to be a question open to doubt, a subject for scientific debate.

Similarly, scientific debate concerning human implication in climatic change appears to be used to delay the adoption of measures that are indispensable if we are to increase our knowledge in this area.

In consequence, the fact that the need for further information is used as a pretext for putting a brake on action and thus blocking the application of the precautionary principle appears particularly dangerous.

But knowledge, debate and information are only of interest insofar as they lead to improvements in the decision-making process.

II - The means of taking action

Today, from a global viewpoint, the poor quality of the decisions taken during the last century in the sphere of health and the environment is due to the particularly injurious influence of the various economic lobbies. They used scientific debate as a means of delaying the introduction of appropriate regulations. Their interventions also led to there being no proper organization of institutions that would be responsible for taking decisions in areas of scientific uncertainty; lastly, the social values and interests that should have been taken into account were largely disregarded.

$\mathbf{A}-\mathbf{Drawing}$ lessons from the past to improve future actions

We must change the way in which the decision-makers are kept informed and we must amend the criteria used to arrive at decisions.

First of all, we need independent institutions, whose members accept personal responsibility for the decisions they take, to counter-balance the weight of the lobbies, which must also be prepared to acknowledge responsibility.

It took a hundred years for asbestos to be banned, a century for the risks associated with PCBs to be taken into account: this is totally unacceptable. As is pointed out in

the EEA report; "Asbestos is a clear example of persistent obstruction and disinformation on the part of the interested parties, and of grave errors in assessment of the situation at the level of introducing regulations".

In other words, so long as the lobbies are really responsible for deciding, directly or indirectly, whether or not products are dangerous, and so long as standards are determined on the basis of economic considerations, rather than in the interests of human health, not only will health and environmental catastrophes proliferate, but there will be an exponential increase in the economic and financial cost to be met by the society which made thoughtless choices although it could well have made quite different choices. It appears to be absolutely crucial for independent institutions and public bodies such as the European Environmental Agency to be empowered to take part in political and social debate and enter into direct contact with decision-makers, especially political decision-makers, on the basis of a surveillance and warning system.

Secondly, economic criteria are given excessive priority, while questions of public acceptability are treated with a certain disdain, or even classed as emotional reactions which have to be set aside; not only are the values held by the general public often based on sound intuitions (e.g. the question of animal-based animal feed), but in addition, the acceptability of a new technology or new product should be included among the criteria on which choices are based.

Lastly, implementation of the cost-benefit principle is itself a source of difficulty.

On the one hand, it is extremely difficult to correctly assess costs and benefits, for the reasons adumbrated above.

Between these who entrench themselves behind claims of zero risk in order to prevent debate and those who recommend a particular solution for purely economic or financial reasons, it is difficult not to adopt a stance based either on the advantages that have been pointed out or on fears concerning the risks being identified. The question of cost and advantages is obviously primordial when assessing the degree of responsibility attached to a problem and when applying the polluter-payer principle. This question in turn raises the question of substitute products and the evaluation of alternatives. The application of existing principles must be accompanied by better use of micro and macro-economies, multi-criteria cartographies, analyses of the life cycles of products, analyses of costs and advantages, analyses of awarenesses and scenarios, integrated environmental assessment (IEA) to enable work to be done on the interfaces between science and politics, an analysis of all the various milieus, and analysis of the alternatives and the compatibility of the mass budget in society as a whole and in the different sectors. It is a matter of assessing both the risks and the economic and financial costs attached to the different solutions proposed.

B - The revolution in responsibility

But the key to genuine improvements in the system lies in ensuring a very close association between the precautionary principle and the responsibility principle.

First of all, it must be stressed that they cannot be separated from one another.

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A precautionary principle totally divorced from any commitment to the responsibility principle on the part of the person or body responsible for taking precautions into account can obviously lead only to very limited and inadequate debate.

A responsibility principle which did not bring the precautionary principle into play would be an extremely reductive principle in which the risks attached to development would be laid on the shoulders of present and future generations without limitation of time.

With regard to this, successful management of the precautionary principle appears to be an absolute necessity.

The variations within the European Union in the way in which the notion of proof is used in the sphere of precautions very clearly demonstrate the varying levels of awareness, which range from scientists' suspicions concerning risks (e.g. the Swedish law concerning chemical products passed in 1973), to the concept of the balance of proof.

The risks of making mistakes in favour of the environment have been reduced to a minimum, whereas negative inaccuracies are numerous, which is unacceptable in view of the very real danger of catastrophes. We must acknowledge the need to overcome ignorance, and the anti-scientific nature of "pretensions to knowledge in the light of consequences that have already occurred", and we must more especially correctly define the precautionary principle (which has absolutely nothing to do with opposing science and everything to do with rejecting closed, reductive, arbitrarily limited science in favour of more people-based, more rigorous, more vigorous science).

The whole question of societal management of the precautionary principle and abandonment of the zero risk theory "bears witness to a fundamental misunderstanding concerning the attitudes and expectations of the general public as a whole, which only increases the public's distrust by inadvertently demonstrating its own scorn for ignorance and its lack of intellectual mastery, which the general public seems to realize more effectively than institutionalized science itself."

Management of the precautionary principle must at the same time lead to increased acceptance of the notion of responsibility, which will not necessarily be automatically shared by the public as a whole.

Taking into consideration the fact taxpayers, who contribute financially via the intermediary of their country, must both act as guinea pigs and pay for all the choices made in the past, often against their will, as in the case of GMOS, is quite certainly the best solution to the problem of reducing environmental and health hazards in coming years.

It is for this reason that it is essential to extend the application of the precautionary principle to the whole field of precautions and ensure the obligatory introduction of insurance schemes or schemes to mutualize risk whenever recourse is had to a new technology or product. If the insurance companies refuse to participate in this, a scheme for mutualizing risk must be set in place between the promoters of the technology or product in question.

To this must be added the concept of personal responsibility, irrespective of their function, on the part of those who knowingly take risks without complying with the procedures for assessment and scientific debate.

This development will only be possible with the support of society as a whole, involving genuine participation on the part of a duly informed public, that is to say a public which has been provided with truthful information, the content of which can be queried beforehand, before the matter is debated by the decision-makers. This whole question is really a matter of ethics and responsibility.

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The problems arise from the way in which scientific knowledge has determined the ethical limits of responsibility and from the acknowledged uncertainties with regard to the consequences of innovative undertakings embarked on by mankind. We are living in a epoch when the dangers are continually increasing, but also at a time of tremendous technological possibilities. It is up to our developed societies, and in particular up to us Europeans, to restore wisdom and the instinct for conservation to the human race: we have strayed too far from these values.

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