

The precautionary principle: between research and politics

**A study of ethical aspects, research challenges, institutional
framework conditions and practical application**

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The National Research Ethical Committees for Natural Science
and Technology
(NENT)
Prinsensgate 18
N-0105 Oslo
Norway

Editing and layout: Nina Kraft and Hilde Storvik

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1. Point of departure

Industrial and economic development has resulted in a continuously greater part of natural resources being subjected to human exploitation and control.

The intentional effects of economic prosperity and increased quality of life in parts of the world may easily be seen. Many encroachments on nature have, however, created unintentional, negative environmental effects that burden present and future generations, and may involve permanent alterations of our natural environment. The greenhouse effect, impoverishing the world's forests, acidic precipitation on large areas of land, pollution of oceans and coastal areas, and a reduction of biodiversity are examples of this.

The precautionary principle has been considered as a central norm in the handling of such great and far-reaching environmental problems. The principle has, however, not been subject to any thorough analysis or given any unambiguous definition. Despite this, it has been used in increasingly more international agreements and national laws.

This was the point of departure of the National Research Ethical Committee for Natural Science and Technology (NENT) for undertaking the task of giving the precautionary principle a thorough analysis, and considering how the principle may be used in a concrete and practical way.

The report has been written by Dr. Matthias Kaiser, Director of the Committee.

1. Summary

The North Sea Convention of 1984, prefatory statements to the EEC Agreement, the UN's Framework Agreement on climatic changes, the UN's Convention on biodiversity, the Rio Convention and the Maastricht Agreement are among the international agreements and documents where the precautionary principle is described and applied.

The precautionary principle has not been formally incorporated into Norwegian laws, but it has nevertheless gained a central position in Norwegian environmental policy. This was among other things emphasised by Norwegian authorities after the UN's regional conference on environment and development in Bergen 1990 and in several statements from the Minister of Environment, among other things to the Storting (the Norwegian Parliament) in spring 1990 and during the presentation of the National Budget for 1991. The principle has not been mentioned in the Gene-technology Act of 1983, but the majority of the Standing Committee on Local Government and the Environment acceded to it when the two white papers on gene-technology were dealt with.

In the report NENT contends that it is not possible to give an indisputable definition of the precautionary principle or establish an unambiguous strategy of action as a result of this. This will be dependent on which choices of value are made.

NENT would like, however, to emphasise the following:

- The concept of sustainable development was a fundamental principle in the UN's World Commission for Development and Environment, which NENT uses as an

important framework of reference for the report. According to NENT the precautionary principle is the most important component of the principle of sustainability. The precautionary principle has priority to other principles such as for instance "nature's toleration limit" and "the polluter pays".

- The precautionary principle has the greatest importance where there is a risk of causing substantial damage to the environment of health, and where the degree of risk is uncertain. Great importance must be attached to the risk of environmental damage when decisions with environmental consequences are to be made. Factors of uncertainty must be made visual to a larger extent prior to decisions.
- There must be a fair distribution and sufficient control of the risk that persons, population groups and natural environment are exposed to. Everybody concerned by a case ought to participate as suppliers of premises and be able to influence the decision. This applies both to experts and non-experts. Spokesmen for parties unable to defend their own cause should be appointed.
- Even with all the research efforts in the world the assessment of future development will always remain encumbered with uncertainty. We cannot expect models of prognosis and planning tools that are so reliable that the precautionary principle becomes superfluous.
- Application of the precautionary principle is connected with underlying choices of value. These may from the starting point be different for different interest groups. We ought to, however, to the greatest possible extent both try to attain consensus with other groups and aim at using the same measure of value independent on whether we are concerned ourselves or not.

NENT's most important recommendations are:

One proposes that "*environmental courts*" are established in selected counties or municipalities, where relevant groups and ordinary lay people are brought into the process of decision in matters that concern the environment. The environmental courts should not replace ordinary political bodies of decision, but become a supplement to those and contribute to dialogue in stead of confrontation in difficult environmental matters. The proposal is meant as a trial project for a five-year period.

- The research milieu assume greater responsibility for clarifying:
 - all relevant factors of uncertainty that ought to be included in the basis of decision.
 - which weaknesses are implied in the theories that predict future development
 - processes of decision where environment comes into conflict with other interests.
 - the ethical foundation for the decisions that are made
 - how research may have a mediating effect on different interests.
- In concrete projects of development resources ought to be earmarked in order to make uncertainties, possible unintentional negative effects and ethical aspects more visible.
- Education of the ethical aspects of research ought to form part of a main subject and a doctor's degree.

2. Scientific uncertainty

Scientific discoveries and hypotheses are often considered as indisputably certain and tenable, both by researchers and most other people. Few people put a question mark at assertions such as "research shows that..." or that "research has now

established ..." There are, however, many examples that researchers have been mistaken, and that one scientific theory is replaced by another.

The report emphasises that principally research is always encumbered with uncertainty. The most important uncertainty lies in the lack of knowledge. There are still blank spaces in our knowledge in vital fields. We know little about the universe, the inner core of the earth or sub-atomic processes. Constantly, more genes become identified, but gene technologists know little about how the genes affect each other and how they become affected by the external environment. Our lack of knowledge about ecological processes and connections is particularly important. The science of to-day cannot predict all trends of development and processes. Not least, we know little about fundamental social processes. Knowledge about the future may therefore be inaccessible even if we have thorough knowledge about a theme.

Decision-makers may still easily be tempted to order "safe" scientific expertise. This means fast and uncomplicated executive work. Expert milieus that contend that they have safe knowledge are consulted, while expert milieus that point at uncertainty and lack of knowledge about the matter, risk not being heard. The wish for simple and unambiguous professional assertions may also involve the consequence that the politicians interpret the researchers' information to be safer than the researchers do themselves.

"*Different*" actors - professions, research groups, trade and industry, political parties and interest organisations - that maintain different views on society and environment, also involve Scientific expertise. Different experts are consultants for employers with contradictory interests. Much of the task may then consist of weakening the credibility of the experts of the opposite party. The "objective" facts thus presented are then strongly marked by the actors' interests and moral attitudes. The report maintains that facts and values cannot be kept clearly apart in the debate on environment.

The report discusses a number of methods often used to remove uncertainty about future environmental consequences, among other things environmental impact analyses, cost-utility calculations and risk analyses. It is pointed out that *environmental impact analyses* are seldom followed up afterwards by studies in order to test the methods that are used. The report maintains that employers of research and The Norwegian Board of Technology have the responsibility of improving the methods of environmental impact analyses. Experience shows that *risk assessments* pay little attention to human errors and to events that rarely occur. Human error is, however, one of the most frequent reasons for mistakes that are made, especially in stressed situations of crises. And even if an event is rare, one ought to have taken into account the fact that it may occur - especially if the consequences of it could prove very detrimental. The report is also critical to the importance of the division between "subjective" and "objective" risk that is incorporated in most established methods of risk analysis.

4. Conditions for applying the precautionary principle

We need not apply the precautionary principle when unambiguous and certain knowledge exists. One has then a basis for clear and straightforward alternatives of

action. If, however, the following conditions are present, the principle ought to be used:

- There is a certain possibility of great damage to environment and health. Possible great damage effects should not be based on loose speculations, but one must be able to express it in credible scientific model scenarios.
- Possible damage must be considerable. Great damage is for instance loss of unique ecosystems. The assessment of the extent of possible damage should take place with great emphasis on nature-given conditions and not only from the point of view of the relevant economic value of the threatened resource.
- By postponing preventive measures now, we complicate an efficient fight against damage that may occur later. It is not very probable that the uncertainties will disappear before the possible damage has begun to appear.

The report calls attention to the fact that an application of the precautionary principle will always be based on certain approximate evaluations and weighing. For this reason it is important to take the following points into consideration:

- The precautionary principle does not necessarily entail that intervention is prohibited only because it may involve a certain environmental or health risk, if intervention at the same time will have great positive social and economic consequences. It must, however, be possible to reverse the intervention if new findings turn up and change the conclusions.
- Because all assessments of the risk of damage and the extent of damaging effects will always be marked by rough estimation and by those who makes the assessment, it is reasonable to claim that the precautionary principle should be based on a broad social consensus of relevant groups. Such an interpretation is also supported by Section 2 of Agenda 21 of the Rio Conference.

5. Ethical reasons for the precautionary principle

5.1 Economic considerations

Experience shows that the costs of cleaning up after an environmental discharge in order to eliminate great environmental damage are generally low. They strongly increase, however, if all environmental damage is to be removed. It may cost more to clean up the last 10% of a discharge than the first 90%. At the same time it is difficult to decide when one has removed so much of the detrimental substances that no risk worth mentioning remains. If one makes it one's particular aim to prevent any detrimental discharge, this will often be so expensive that there will not be enough resources left for other aims, nor for other environmental measures. An ethical evaluation may conclude that it would be correct to accept a certain degree of dangerous discharge. Neither the precautionary principle nor ethics prepare for a zero risk society.

Prohibiting all discharge that is detrimental, will in practice entail the prohibition of 70 000 chemical substances. This may have economic and social consequences that a modern society is not willing to accept. If for instance all pesticides are prohibited, this may lead to serious hunger catastrophes. The report warns against an environmental policy that does not gain acceptance from the population, and therefore cannot be carried out without great risk of social unrest.

An appropriate environmental strategy should take into consideration social and economic stability as a condition. It is, however, emphasised that the precautionary principle cannot be realised from economic considerations and measures alone. Cost utility calculations are often difficult to use with regard to environmental issues. It is rarely possible to measure qualitative values in terms of money. Contrary to many other methods of approach the precautionary principle applies as a point of departure values that go beyond economic values.

5.2 Future generations

Both "sustainable development" and the "precautionary principle" operate with a time perspective longer than with traditional models of risk evaluation. How far we are committed into the future may be a matter of discussion. The report concludes that we who live today have a clear responsibility for future generations. The report is therefore critical towards a practice of discounting risk and environmental damage over time. This responsibility should nevertheless be balanced in relation to the responsibility for the generation of today. In general, consideration of future generations cannot easily justify limitations of the fundamental human rights of contemporary generations.

5.3 Human centred versus nature centred ethics

Certain protectors of the environment and philosophers (for instance deep ecologists) put the totality of nature as the primary ethical subject. For those people the main thing is that *ecosystems* survive. They maintain that nature has an intrinsic value independent of human need for clean air, access to food and recreation etc.

The Brundtland Commission built on fundamental anthropocentric (human centred) ethics in its report. According to the final report of the Commission the destruction of nature should be avoided primarily in order that human beings may survive - even though nature's value is also emphasised.

The precautionary report does not come to any decision in principle on "human centred" versus "nature-centred" ethics, but concludes that the cautionary principle as a foundation for *political* action should be based on the ethical fundamental attitudes that have the greatest support in the population. A nature-centred way of thinking feels strange to most people. This is also in line with the Constitution § 110, in which *people's* right to an environment of a certain quality forms a point of departure. The report emphasises, however, that also human centred ethics ought to make great environmental considerations. We are all dependent on the same, limited natural resources. One may therefore take into consideration that nature centred and human centred ethics in practice will often be concurrent, when the human being to a greater extent realises his dependence on nature.

5.4 Participation

The report further discusses people's moral responsibility when we do not have complete information prior to action. If one hits a pedestrian with an old car, one cannot say afterwards that one did not know the brakes were faulty. It is well known that old cars often have faulty brakes. One should have controlled the brakes in advance. In the same way we know that introduction of new technology often involves risks one was not prepared for.

Evaluations of unknown effects that may occur have to be approximate. Who is to assess such rough uncertainties? The report answers that the experts should not be the only ones to do the evaluation. The experts are seldom those who suffer most even if they are mistaken in their predictions. Large population groups may often suffer more than an elite of experts. Those who suffer may have different views on what sort of risk they are willing to accept than the experts or the decision-makers.

Those who are to suffer the consequences of a decision have a moral right to make those in power responsible. In this connection the report goes further than just saying that it is reasonable to complain afterwards, when it appears that a decision has had detrimental consequences without anybody having informed about the risk.

Individuals and groups who have to live with the consequences of the decisions, have the same moral rights to learn about and take part themselves in the evaluation of the consequences *in advance* as they have to complain about damage afterwards. When it is not possible to estimate beforehand whether the outcome of an action will entail a just distribution of advantage and risk in the population, it is important that the *process* towards the action is just. This ought to a large extent apply from the planning stage. The present practice of official hearings has its limitation. They often take place late in the process when the terms have already been laid by the experts. Researchers have no tradition of asking relevant groups for advice concerning what is important to know about an issue.

6. The precautionary principle in relation to the principle of sustainable development and other principles/strategies

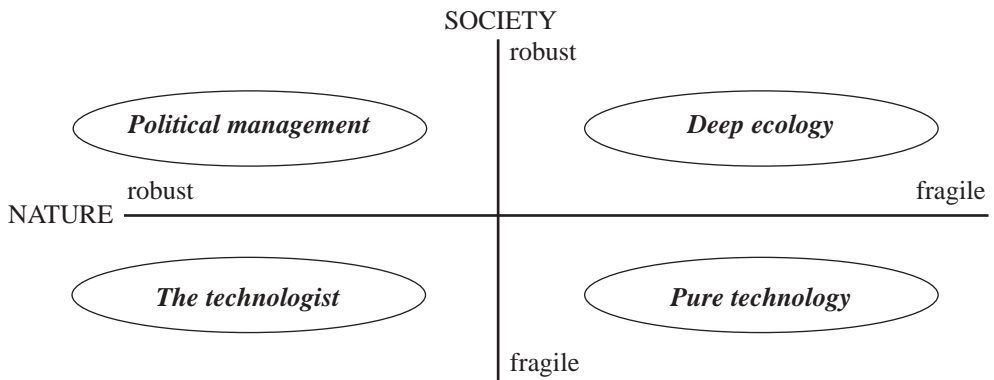
The precautionary principle is according to NENT, the principle that can best ensure sustainable development. It must have priority to other parts of the principle of sustainable development, such as the principles of "polluter pays", "user pays" and the "subsidiary principle" (e.g. that a decision should be made at a level as close as possible in relation to those who are concerned).

Principles and processes that are not components of the principle of sustainable development are also often drawn into the environmental debate. In NOU 1995:4 "Methods and Means in Environmental Politics" the precautionary principle is for instance placed side by side with five such principles: the principle of nature's toleration limits, the principle of polluter pays, the cradle to grave principle, the principle of best accessible technology and the principle of cost-effectiveness. Not all these are compatible with the precautionary principle. They are on the whole more geared on economy and put less emphasis on factors that cannot be counted. The report assumes that the wording of the NOU is not very thoroughly considered, and asks for reasons for why the precautionary principle in official documents is partly presented as a superior and partly as a co-ordinate principle.

7. Nature's vulnerability, society's vulnerability, attitudes to risk

The precautionary principle is not an exact recipe of how to act in a given situation, but a *standard*, on a par with other standards of society. We have ethical, judicial and other standards. Respecting other people's dignity as human beings is for instance a widely accepted ethical standard, but how to practice it, for instance in welfare services for old people, may often be a question of interpretation.

How one puts the precautionary principle into practice depends on how vulnerable one thinks that nature is and how vulnerable one thinks society is. The report bases its theory on the fact that both nature and society are so complicated that it is not possible to measure their vulnerability with any degree of certainty. Our opinions of their vulnerability are therefore to be considered as relatively fundamental convictions. The precautionary principle may therefore be used by people with different attitudes to society and nature. From this also follows a different degree of risk aversion/risk willingness.



In order to bring forth the attitudes of the four categories we may use as an example consequences of increased contents of hot house gases in the atmosphere. Many people fear "the climate effect", global heating causing great consequences for ecosystems, farming, the economy of developing countries. Additionally, the social consequences may be high, with among other things mass-migration. These are frightening future prospects. It is on the other hand uncertain whether all this will happen, and how serious the effects will be. How should one act then?

A. If one takes as a point of departure a *deep ecological* view, one would recommend radical interventions in economic and social structures that a fast stabilisation of the hot house gases will demand. In relation to climate problems this means that one immediately stops using fossil energy sources and that the rich countries reduce their consumption and use of energy. Nuclear power is not allowed as a substitute for fossil energy resources on account of other non-climate related environmental risks. Farming should immediately be changed towards more ecological running. Population growth should be quickly stopped - or one will have to accept hunger. The world economy should be radically altered.

Such a strategy takes as a point of departure a view of nature as something very vulnerable, but takes a view of society as robust enough to tolerate great changes without leading to social unrest, war, criminality etc.

B. A strategy of *political control* implies that one initiates a long-term political process that in the course of time will lead to the introduction of technologies that are

economical for nature. Eco-tax, environmental discharge fees and reform of international trade - especially for agricultural products and raw materials - will become a central means to an end in order to combat the hot house effect. Introduction of this strategy would turn transport of commodities and people into a luxury benefit, and may connect aid to developing countries with measures against population growth.

This strategy attacks the environmental problem at a secondary level. One trusts that a social transformation in the long run will lead to environmental improvements. But even if the social structure has to be reformed, the great social upheaval that is involved in the first strategies would be avoided.

The point of departure for political control is a view of both nature and society as something rather robust.

C. A strategy of *clean technology* implies that environmental problems are attacked directly, without resorting to social intervention. One presupposes that the environmental problems are not due to social structures, for instance the consumption pattern, but to technology alone. For this reason new, environmentally non-detrimental technologies are being developed. Coal and oil are rejected as energy sources, only renewable energy sources are accepted. Intensive measures to restoring desert areas and infertile areas are also part of this strategy. It accepts nuclear power where necessary because of population growth and economic development.

This strategy is based on the view that society and environment are extremely vulnerable.

D. A *technologist* strategy also involves a development of new technologies that are less detrimental to the environment, but at a lower speed than with a strategy of clean technology. One is less willing to burden society, and therefore less willing to accept economic burdens by moving ahead rapidly. In the example of hot house gases and climate effect great resources will be concentrated on reducing technological uncertainty. The rich countries increase economic growth without consuming more energy, but by means of technical improvements, improved insulation of houses, less fuel consumption in cars etc. Greater efforts will be made to support developing countries by among other things improving the education of women thus reducing population growth. Nuclear power and gas power will be used to a greater extent, as a compensation for oil which burdens the atmosphere more. Research on alternative energy resources will be increased many times.

Such a strategy avoids high social costs, but assumes that the environment can tolerate considerable strain for some time ahead. Society is here considered as fragile, while nature is perceived as more robust.

The report does not explicitly come to a decision as to whether it is possible to implement these four extremes or which of them is from an ethical point of view the best solution, but demands properly thought out viewpoints from actors that participate in the debate. One may for instance be a supporter of political control in one question, but support a technologist strategy in another question where one has

self-interest. The present situation seems too much marked by people taking one perspective where one expects to gain a benefit oneself, and taking another perspective where one assumes a possible burden.

8. The role of the researcher in the handling of scientific uncertainty

Even if the report is sceptical to a positivistic scientific view it is not critical to research. A lot of basic research gives good understanding of the mechanisms of nature. Research has contributed to bringing to light environmental problems, and research may contribute to reducing environmental problems, for instance by developing better wastewater treatment plants, and by finding substitutes for substances detrimental to health, etc.

However, NENT emphasises that research should also take the responsibility of finding better solutions at a superior social level. For instance, the researcher ought to make clear what criteria one applies as a basis when the precautionary principle is used as an argument for a decision. They ought to disclose connections between technology and society. They ought to contribute to the working out of better routines and better models for assessment of risk, for instance a follow-up of analyses of consequences.

The report also emphasises that education in ethics and the ethical consciousness of the researchers should be strengthened. The time set off for the training of researchers in how to make visible the factors of uncertainty they encounter in their research, does not seem to be in proportion to the importance this has in relation to sustainable environmental policy based on the precautionary principle. According to the report, this is a weakness of our research efforts and our imparting of research.

However, there are limitations with regard to what research is able to contribute. In fields with the greatest problems and where interests and values between groups and individuals in society are different, the challenge is how to arrive at solutions that may gain consensus. This is a *political* question.

9. Participation by the groups concerned

Political decisions on the use of the precautionary principle are too far-reaching, many-sided and too much based on values to be treated as a matter of routine by the administration. According to NENT they ought to be left to political bodies of decision. Popularly elected people represent different groups with different moral attitudes among the population and have great legitimacy concerning issues of value.

Popularly elected bodies have, however, weaknesses. For one thing, the opinions of the minority may be ignored. From the principle that all votes should count equally, it is unfortunate if a great and relatively stable minority never gets heard. Secondly, environmental issues where the precautionary principle ought to be applied are almost always relevant over a longer time perspective than an election period. Thirdly, a strategy of the precautionary principle will be more effective on a basis of a broad consensus. Finally, the politicians are usually dependent on advice from experts who also have different priorities of values and therefore often arrive at different recommendations.

The report therefore recommends an element of direct democracy in such processes - as a contribution to, but not a substitution for the popularly elected. Participation in processes of decision gives the participants insight into the matters they are dealing with, and greater respect for other people's opinions. This can be as important as the decisions themselves. Direct democracy also creates interest in and consciousness of the administration of affairs, and as such is also to the benefit of popularly elected bodies.

In some direct democratic processes majority decisions are not applied, such as we are used to, but *decisions by consensus*. The participants in a consensus model are free to make their opinions - they are not bound by viewpoints from parties, interest organisations etc. It is often easier for the participants in such a model to change their viewpoints than for participants in a more traditional majority model.

Another difference between the majority model and the consensus model is that in the latter all the participants commit themselves to a higher degree. Where there are a majority and a minority, the minority might always subsequently work against the decisions. The consensus model implies that all the participants agree as far as they are able to. One does not express any opinion on points where one has not arrived at agreement. In this way everybody is to a larger extent able to support the final result.

Some theorists are of the opinion that consensus is not only a mobilising and effective way of arriving at an agreement, but that the method also may be used in order to find out what is right or good. Certain conditions, especially in a "dialogue free of mastery" - e.g. that all parties in a process should have equal admission to information and equal power, ought to be fulfilled. The report points to Jürgen Habermas among several other philosophers and social scientists, but does not explicitly come to a decision as to whether the consensus model leads to a *morally correct* decision.

10. A proposal of introduction of "environmental courts"

From the considerations above about scientific uncertainty, different priorities of value and interests between different groups, different views of nature's and society's vulnerability and the importance of broad participation, the report recommends experimenting with "environmental courts" in order to evaluate concrete matters where the precautionary principle ought to be applied. Environmental courts ought to consist of people with different knowledge and different moral attitudes - they may be experts in a broad sense or representatives of the public, lay people.

Environmental courts ought to be advisory. In the first round a trial project of five years in certain districts is proposed.

Environmental courts ought to have as an aim to propose concrete measures in order to implement the precautionary principle, and develop visions for a regional sustainable development. Their work ought to be based on consensus in the group and broad representation of the composition of interests and moral attitudes of the local society. The report proposes that municipalities and county municipalities take the initiative to form such environmental courts. Local authorities ought to provide a basic grant, but broader groups ought to be drawn in at an early point of time.

State authorities ought to encourage such environmental courts, for instance by allocating economic grants. Further more local expertise such as regional colleges and research institutions should be invited to participate. The National Research Ethical Committees (NEM, NENT and NESH) may function as a common point of reference for the environmental courts.

The proposal is inspired by the Canadian "multistakeholder round tables". The ideas behind the round tables were promoted by the Canadian Task Force on Environment and Economy in 1987. Since then the Canadians have had many such round table groups, on a national, regional and local plan. As per May 1994 there were for instance established 40 local round table groups just in British Columbia.

The Canadian round table groups have a wide mandate, with emphasis on environmental, economic and social aspects. Different interests are represented, for instance local authorities and interest organisations. The round tables are advisory and may be permanent or ad hoc. The addressees of the conferences may be the government, local or regional authorities and interest organisations. Topics of the conferences have among other things been development of water power, golf courses versus the building of houses, regulation of cattle and common grazing land, tourism, parking of bicycles, re-cycling programmes and sorting of waste, water environment and regulation of rivers etc. Defining what is sustainable development has been a central task for all the round tables.

There are several reports on how the Canadian round tables function and they receive on the whole a great deal of praise. A report from the United Kingdom's Global Environment Research Centre from 1993 states for instance:

"...almost all involved (in local round tables) emphasized how important their local round table has been as a way of bringing the community closer together, making it more aware of its own strengths and weaknesses, and of building agreement on the long term future of the community. Local government was seen as a natural partner, which itself benefited considerable from the process. In this context, advantages were seen to be increased credibility and political legitimacy resulting from broader public involvement, greater participation by talented and influential individuals, the mobilization of relatively low cost of a wide range of outside talent to help develop long-term plans and provision of a longer term perspective than local participants could themselves realistically hope to offer."
(Gordon, J. 1994)

The report regards the introduction of environmental courts, inspired by the Canadian round tables, as a concrete political tool in order to increase society's precautionary preparedness and to change course towards a sustainable society.