



appendix 1

Context and process

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# 2.2 Genetic modification and the precautionary approach

## Introduction

The precautionary principle is based on the concept of taking anticipatory action to prevent possible harm under circumstances where there is a level of scientific uncertainty. However, there is much discussion and diversity of opinion as to defining and applying the principle. Because application of the principle is particularly important in issues of genetic modification, this section outlines the development of the principle and gives examples of differing interpretations of the principle in international usage, including its application in New Zealand.

The precautionary principle emerged in European environmental movements and began to be incorporated in legislation and other agreements in the 1970s, reflecting a growing concern about the ability of scientific risk assessment and management models to accurately predict the adverse effects of new and complex technologies. It has been said that its roots are in the 1930s German concept of *Vorsorgeprinzip* (“foresight planning”) used to distinguish between the dangers and the risks caused by human behaviour. Two different approaches were required: to prevent dangers on the one hand; but, where there was only a risk of effects occurring, to investigate risk prevention and, if warranted, apply preventative measures (Coates 2000).

Because the precautionary principle has evolved over time and in a number of places for different purposes, there is no one generally agreed definition, nor is there any uniform interpretation of the principle.

## Current status in the international context

The precautionary principle is one of the basic premises of international environmental law. It currently appears in over 20 international treaties, laws, protocols, and declarations (Table 2.2 gives a range of examples).

It has been considered by the International Court of Justice (eg, New Zealand’s case against France on nuclear tests in the Pacific).

**Table 2.2    International statements of the precautionary principle**

Statements from Conventions	
1	<p><i>London Convention 1972</i> (Resolution LDC. 44/14, 1991):</p> <p>AGREES that in implementing the London Dumping Convention the Contracting Parties shall be guided by a precautionary approach to environmental protection whereby appropriate preventive measures are taken when there is reason to believe that substances or energy introduced in the marine environment are likely to cause harm even when there is no conclusive evidence to prove a causal relation between inputs and their effects;</p> <p>AGREES FURTHER that Contracting Parties shall take all necessary steps to ensure the effective implementation of the precautionary approach to environmental protection and to this end they shall:</p> <ul style="list-style-type: none"><li>(a) encourage prevention of pollution at the source, by the application of clean production methods, including raw materials selection, product substitution and clean production technologies and processes and waste minimization throughout society;</li><li>(b) evaluate the environmental and economic consequences of alternative methods of waste management, including long-term consequences;</li><li>(c) encourage and use as fully as possible scientific and socio-economic research in order to achieve an improved understanding on which to base long-range policy options;</li><li>(d) endeavour to reduce risk and scientific uncertainty relating to proposed disposal operations; and</li><li>(e) continue to take measures to ensure that potential adverse impacts of any dumping are minimized, and that adequate monitoring is provided for early detection and mitigation of these impacts ...</li></ul>
2	<p><i>UN Framework Convention on Climate Change</i> (Article 3(3), 1992):</p> <p>The Parties should take precautionary measures to anticipate, prevent or minimise the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost effective so as to ensure global benefits at the lowest possible cost ...</p> <p><i>continued</i></p>

Table 2.2 continued

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*Convention on the Protection of the Marine Environment of the Baltic Sea Area* (Article 3(2),1992)

The Contracting Parties shall apply the precautionary principle, i.e., to take preventative measures when there is reason to assume that substances or energy introduced, directly or indirectly, into the marine environment may create hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea even when there is no conclusive evidence of a causal relationship between inputs and their alleged effects.
- 4

*Convention for the Protection of the Marine Environment of the North-East Atlantic* (Article 2(2)(a),1992)

The Contracting Parties shall apply:

(a)

The precautionary principle, by virtue of which preventive measures are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and the effects...
- 5

*Treaty on European Union* (Article 130r(2), 1992)

Community policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Community. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay. Environmental protection requirements must be integrated into the definition and implementation of other Community policies.

Non-treaty statements

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*Declaration of the Second North Sea Conference* (Paragraphs VII and XVI.1,1987)

Accepting that, in order to protect the North Sea from possible damaging effects of the most dangerous substances, a precautionary approach is necessary which may require action to control inputs of such substances even before a causal link has been established by absolutely clear scientific evidence...

[The participants] accept the principle of safeguarding the marine ecosystem of the North Sea by reducing polluting emissions of substances that are persistent, toxic and liable to bioaccumulate at source, by the use of the best available technology and other appropriate measures. This applies especially when there is reason to assume that certain damage or harmful effects on the living resources of the sea are likely to be caused by such substances, even where there is no scientific evidence to prove a causal link between emissions and effects ("the principle of precautionary action")...

2 *UNEP Governing Council Recommendation* (12th Meeting, May 25, 1989)

Recognizing that waiting for scientific proof regarding the impact of pollutants discharged into the marine environment may result in irreversible damage to the marine environment and in human suffering.

Also aware that policies allowing uncontrolled discharges of pollutants continue to pose unknown risks...

The UNEP Governing Council recommended that all Governments adopt the 'principle of precautionary action' as the basis of their policy with regard to the prevention and elimination of marine pollution.

3 *Bergen Declaration* (Paragraph 7, 1990)

In order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

4 *Declaration of the Third International Conference on the Protection of the North Sea* (Preamble, 1990)

[The participants] will continue to apply the precautionary principle, that is to take action to avoid potentially damaging impacts of substances that are persistent, toxic and liable to bioaccumulate even where there is no scientific evidence to prove a causal link between emissions and effects.

*continued*

Table 2.2 continued

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*Agenda 21* (Oceans Chapter 17, Paragraph 17.21, 1992)

A precautionary and anticipatory rather than a reactive approach is necessary to prevent the degradation of the marine environment. This requires, inter alia, the adoption of precautionary measures, environmental impact assessments, clean production techniques, recycling, waste audits and minimization, construction and/or improvement of sewage treatment facilities, quality management criteria for the proper handling of hazardous substances, and a comprehensive approach to damaging impacts from air, land and water. Any management framework must include the improvement of coastal human settlements and the integrated management and development of coastal areas.

When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if the cause and effect relationship are not fully established scientifically.

Most notably the precautionary principle has been specifically incorporated in Principle 15 of the 1992 United Nations Conference on Environment and Development (The Rio Declaration) which states that:

where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation

Article 11.8 of the Cartagena Protocol on Biosafety (January 2000) states:

Lack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of the potential adverse effects of a living modified organism on the conservation and sustainable use of biological diversity in the Party of import, taking also into account risks to human health, shall not prevent that Party from taking a decision, as appropriate, with regard to the import of that living modified organism intended for direct use as food or feed, or for processing, in order to avoid or minimize such potential adverse effects.

However, because the Protocol provides that risk assessments are carried out in a scientifically sound and transparent manner, the exact impact of the Protocol remains unclear. This reflects a central unresolved issue in national and international invocations of the principle, namely, the issue of what level of scientific evidence of potential harm is required to trigger the application of precaution.

The Rio and Cartagena formulations are widely cited as definitive statements of the precautionary principle by both supporters and critics.

## New Zealand use of the principle

New Zealand is a party to the multilateral environmental agreement, the Rio Declaration on Environment and Development, which was one of the achievements of the 1992 UN Conference on the Environment and Development (UNCED or the 'Earth Summit').

The Declaration has 27 guiding principles for sustainable development, including the precautionary approach which states that lack of full scientific certainty of the causes or effects of environmental damage should not be a reason for delaying action to prevent such damage. Such a principle is not legally binding but parties to the Declaration agree to respect it when considering a particular environmental issue. New Zealand's environmental legislation is considered to be largely in accord with the themes of Agenda 21, the plan to implement the Rio Declaration principles, and the challenge is their satisfactory application here.

The precautionary principle has been included in the key legislation governing genetic modification in New Zealand. Section 7 of the Hazardous Substances and New Organisms Act 1996 describes the “precautionary approach” as involving:

the need for caution in managing adverse effects where there is scientific and technical uncertainty about those effects

In July 1995, Government also adopted the precautionary approach as one of the guiding principles in the Environment 2010 Strategy for integration of environment, society, and the economy.

At another level, the joint standard on Risk Management published by Standards New Zealand and Standards Australia (AS/NZS 4360) and the associated *Handbook 203-2000: Environmental Risk Management — Principles and Process* note that adoption of the principle or a precautionary approach is one way of addressing the inherent uncertainty and ignorance associated with environmental decisions. Organisations have to take decisions, but in some cases the decision-maker must explicitly recognise that unknown factors exist.

## Elements of the principle at issue

Generally, the core elements or directions underlying the precautionary principle, and also the main areas of debate, are:

- recognition of scientific uncertainty and fallibility
- presumption in favour of health and environment protection (ie, a willingness to take action in advance of formal scientific proof)
- a shift in the onus of proof and standards of evidence to those who propose change (ie, the users of the technology must prove with low margins of error that it is safe, rather than challengers of the technology having to prove unacceptable risk to the same standard of proof)
- standards of acceptable risk (safety)
- providing ecological margins of error
- cost-effectiveness of action or inaction (ie, some consideration of proportionality of costs associated with the use or non-use of the technology; thus, the more catastrophic the potential effect, the more presumption in favour of precaution despite its costs)
- intrinsic value of non-human entities
- concern for future generations
- paying for ecological damage through strict/absolute liability regimes.



The common criticisms of the precautionary principle include:

- The precautionary principle lacks a uniform interpretation. One study found 14 different interpretations of the principle (Foster et al, 2000). Some treaties, such as that of the European Union, refer to the principle but do not define it. Other international instruments, such as the Cartagena Protocol, adopt it in an ambiguous manner.
- The precautionary principle marginalises the role of scientists and can be applied in an arbitrary fashion. This criticism is based upon the concern that the invocation of the principle usually involves the relaxation of the standards of proof normally required by the scientific community. In the face of evidence less rigorous than that required for “science-based” conclusions, decision-making then invokes other, extra-scientific considerations.
- The precautionary principle is used as a veiled form of trade protectionism. The essence of this criticism is that the principle is used to circumvent the fundamental rules established by trade agreements enforced by the World Trade Organization, which generally require a showing by an importing country of reliable scientific evidence that an exported product poses levels of risk not accepted in domestic products (eg, the Agreement on the Application of Sanitary and Phytosanitary Measures). The precautionary principle undermines the force of this requirement by releasing the importing country from the onus of proof and/or relaxing the rigour of the scientific evidence required to allege unacceptable risk.
- The use of the precautionary principle is a form of over-regulation that will lead to a loss of potential benefits (such as increases in agricultural productivity).

## References and further information

### Publications

Coates D. 2000. The Precautionary Principle — “Nothing ventured, nothing gained”? *Avicare Insights* 1: 2.

Foster KR, Vecchia P, Repacholi M. 2000. Science and the precautionary principle. *Science* 288: 979–981.