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THE PRECAUTIONARY PRINCIPLE OF ENVIRONMENTAL LAW: AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE

By

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ABSTRACT

Environmental protection is a topical issue of concern across the global community in the face of undesirable consequences of environmental degradation. Such consequences include global warming, climate change, flooding, desertification, loss of biodiversity, scarcity of water, food and intense weather conditions. Various principles have been developed in the quest for acceptable regulatory framework for the protection of the environment, including the principle of precaution. This Article adopts the view that precautionary principle is a step ahead of the preventive principle, arguing in accord with Article 15 of the Rio Declaration that environmental measures must foresee, prevent and deal with the causes of environmental degradation which threaten to cause serious or irreversible damage, notwithstanding the absence of full scientific evidence.

The article adopts the doctrinal research method and divided into six parts. The introduction is followed by an overview of the precautionary principle while the third part examines the criteria for its application and in the fourth part, the reasons for and advantages of the precautionary principle are examined. It analyses the debates and criticisms of the Precautionary Principle in the fifth part and it concludes with a summary and recommendation that precaution is to be preferred to remedial approaches.

INTRODUCTION

Precaution is a concept that is akin to the saying that prevention is better than cure in ordinary parlance. In the context of the principles of environmental law however, precautionary principle differs from the preventive principle. Whereas the preventive principle can be traced to international environmental treaties and

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other international laws since the 1930s, the precautionary principle only began to appear in international legal instruments in the mid-1980s, although prior to that time it had featured as a principle in domestic legal systems, most notably that of West Germany.¹ The German concept of "*Vorsorgeprinzip*" (translated as principle of foresight or the precautionary principle) prescribes that society was to engage in careful study and planning, to avoid environmental and health damage from potentially harmful activities. That is, it served as a yard stick for judging policy decisions.²

Although there is no generally accepted definition of the precautionary principle, one commonly cited definition is that which is contained in the later 1990 Bergen Ministerial Declaration on Sustainable Development. The fact that there is no generally acceptable definition of the principle has been a major ground on which it has been attacked by its critics. It is however a common thing to find that key concepts hardly have universally accepted definitions in law, thus this is not an exception.

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

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1. K. Von Moltke: *The Vorsorgeprinzip in West German Environmental Policy*, in Twelfth Report (Royal Commission on Environmental Pollution, UK, HMSO, CM 310) p. 57, cited in P. Sands: 2003, *Principles of International Environmental Law*, Cambridge: Cambridge University Press (2nd Ed.), 1988 p. 233, 267. It is notable that in the mid-1970s, West Germany's legislature enacted a national environmental policy which provided for a precautionary approach to environmental protection.
 2. Smith, C., "The Precautionary Principle and Environmental Policy Science, Uncertainty and Sustainability" *International Journal for Occupational and Environmental Health*. Vol. 6 No.3. 2000 pp. 263 at 263. See also, R. E. Deloso: *The Precautionary Principle: Relevance in International Law and Climate Change*. Thesis. International Environmental Science. Lund University. Sciences. 2005. p. 15. Retrieved July 7, 2012, from http://www.lumes.lu.se/database/alumni/04/05/theses/rabbi_deloso.pdf.

should not be used as a reason for postponing measures to prevent environmental degradation³.

According to Sands, at the most general level, it means that states agree to act carefully and with foresight when taking decisions which concern activities that may have an adverse impact on the environment.⁴ A more focused interpretation provides that the principle requires activities and substances which may be harmful to the environment to be regulated, and possibly prohibited, even if no conclusive or overwhelming evidence is available as to the harm or likely harm they may cause to the environment.⁵ Kiss and Shelton put it in a more precise manner when they described it thus: "Precaution means preparing for potential, uncertain, or even hypothetical threats, when there is no irrefutable proof that damage will occur".⁶ The precautionary approach⁷ is a logical extension of commonsense concepts that guide daily life: "an ounce of prevention is worth a pound of cure". The United States Government maintains that precaution is an approach, as opposed to a "more formalized principle". Thus, "precautionary approach" and "precautionary measures" are the languages that have been negotiated into many Multilateral Environmental Agreements (MEA), particularly those involving the United States. Precaution poses the challenge

3. The May 1990 Bergen Conference on Sustainable Development was hosted by Norway and co-sponsored by United Nations Economic Commission for Europe (UNECE). The Conference was one of a series of regional meetings held in advance of the June 1992 United Nations Conference on Environment and Development (UNCED). Retrieved June 25, 2013, from www.unfccc.int/resource/ccsites/senegal/fact/fs220.htm.
4. P. Sands: Principles of International Environmental Law, Cambridge, Cambridge University Press (2nd Ed.), 2003, p. 272.
5. Cameron, J. & Abouchar J., "The Precautionary Principle: A Fundamental Principle of Law and Policy for the Protection of the Global Environment" Boston College International and Comparative Law Review Vol. 14 No.1, 1991 pp. 1 - 2.
6. A. Kiss & D. Shelton: Guide to International Environmental Law, Boston: Martinus Nijhoff Publishers, 2007, p. 95.
7. See S. Shaw & R. Schwartz: Trading Precaution: The Precautionary Principle and the WTO. United Nations University Institute of Advanced Studies (UNU-IAS) Report 2005, p. 5. Retrieved June 23, 2013, from www.ias.unu.edu/binaries2/Precautionary%20Principle%20and%20WTO.pdf.

that, to prevent harm before it occurs is better than seeking for a remedy. It holds that when there is scientific evidence that an activity threatens wildlife, the environment, or human health, protective measures should be taken even in the absence of full scientific certainty.⁸ Thus, it is a better-safe-than-sorry approach, in contrast with the traditional reactive wait-and-see approach to environmental protection. It is based on the understanding that it is not always possible, and rarely easy, to know environmental consequences.⁹

In a nutshell, precaution epitomizes a paradigmatic shift from the minimum level of mere prevention to a more advanced state of precaution even in the absence of full scientific proof. Under a preventive approach, the decision-maker intervenes provided that the threats to the environment are tangible. Pursuant to the precautionary principle however, authorities are prepared to tackle risks for which there is no definitive proof that there is a link of causation between the suspected activity and the harm, or whether the suspected damage will materialize. In other words, precaution means that the absence of scientific certainty – or conversely the scientific uncertainty – as to the existence or the extent of a risk should henceforward no longer delay the adoption of preventative measures to protect the environment. Put simply, the principle can be understood as the expression of a philosophy of anticipated action, not requiring that the entire corpus of scientific proof be collated in order for a public authority to be able to adopt a preventive measure.¹⁰ Thus, it is considered as the most developed form of prevention that remains the general basis

8. Smith, C. *Op. Cit.* (note 2). p. 263.

9. G.O. Amokaye: *Environmental Law and Practice in Nigeria*, Lagos University of Lagos Press, 2004, p. 97. See also, Aigbokhaevbo, V. O., "International Environmental Law Principles: Sustainability challenges" *University of Benin Law Journal* Vol. 1 No. 1, 2010 pp. 147-150.3

10. N. De Sadeleer: *The Principles of Prevention and Precaution in International Law: Two Heads of the Same Coin?* In Fitzmaurice M., *et al.*(eds.): *Research Handbook on International Environmental Law* Cheltenham: Edward Elgar Publishing Ltd, 2010, p. 182 at 184.

for environmental law, and this is because it is prevention based on probabilities or contingencies.¹¹

OVERVIEW OF THE PRECAUTIONARY PRINCIPLE

According to Sands,¹² the precautionary principle finds its roots in, and developed from the more traditional environmental agreements which call on parties to such agreements, and the institutions they create, to act and to adopt decisions which are based upon 'scientific findings' or methods,¹³ or 'in the light of knowledge available at the time'¹⁴ These standards suggest that action shall only be taken where there is scientific evidence that significant environmental damage is occurring, and that in the absence of such evidence no action would be required. Examples of a traditional approach include Convention for the Prevention of Marine Pollution from Land-Based Sources, 1974 (Paris Convention), Article 4(4), which allows parties to take additional measures 'if scientific evidence has established that a serious hazard may be created in the maritime area by that substance and if urgent action is necessary'. This requires the party wishing to adopt measures to 'prove' a case for action based upon the existence of sufficient scientific evidence, which may be difficult to obtain. The 1969 Intervention Convention¹⁵ was one of the earliest treaties to recognize the limitations of the traditional approach, concerning the environmental consequences of a failure to act. It allows proportionate measures to be taken to prevent,

11. A. Kiss & D. Shelton: *Op.Cit.* (note7) p. 95.

12. P. Sands: *op.cit.* (note 5) pp. 267-268.

13. International Convention for the Regulation of Whaling, 1946 (Whaling Convention), Art.V(2); Convention for the Conservation of Antarctic Seals, 1972 (Antarctic Seals Convention), Annex, para. 7(b); Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972 (World Heritage Convention), Preamble; Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter, 1972 (London Convention), Art.XV(2); Convention on the Conservation of Migratory Species of Wild Animals, 1979 (Bonn Convention), Arts. III(2) and XI(3) (action on the basis of 'reliable evidence, including the best scientific evidence available').

14. Radiation Protection Convention, 1960 (Radiation Convention), Art.3(1).

15. International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969.

mitigate or eliminate grave and imminent danger to coastlines from threat of oil pollution, taking account of 'the extent and probability of imminent damage if those measures are not taken'.¹⁶

Early evolution of the precautionary principle at the international level began in the 1980s. Although much of the early development of the precautionary principle was in regional agreements within Europe, the precautionary principle was first explicitly introduced into international negotiations in the North Sea Ministerial Conferences. As early as 1980, the German Council of Experts in Environmental Matters found that the principle was a "requirement for a successful environmental policy for the North Sea ecosystem."¹⁷ The principle was included in the 1984 Ministerial Declaration of the International Conference on the Protection of the North Sea,¹⁸ the Final Declaration of the Second International North Sea Conference in 1987¹⁹ and at the third North Sea Conference in 1990.²⁰ These

16. 1969 Intervention Convention, Arts. I and V(3)(a).

17. Gündling, L., "The Status in International Law of the Principle of Precautionary Action" *International Journal of Estuarine & Coastal Law* Vol. 5, 1990 pp. 23-24 (citing *Der Rat der Sachverständigen für Umweltfragen, Umweltprobleme der Nordsee*, 1980); cited in Saladin, C., "Precautionary Principle in International Law" *International Journal for Occupational and Environmental Health* Vol. 6 No. 3, 2000 p. 270 at 273.

18. The Preamble reflected a consciousness that states 'must not wait for proof of harmful effects before taking action', since damage to the marine environment can be irreversible or remediable only at considerable expense and over a long period.

19. Gündling, L., "The Status in International Law of the Principle of Precautionary Action" *International Journal of Estuarine & Coastal Law* Vol. 5, 1990 pp. 23-24 (citing *Der Rat der Sachverständigen für Umweltfragen, Umweltprobleme der Nordsee*, 1980); cited in Saladin, C., "Precautionary Principle in International Law" *International Journal for Occupational and Environmental Health* Vol. 6 No. 3, 2000 p. 270 at 273. Second International Conference on the Protection of the North Sea: Ministerial Declaration Calling for Reduction of Pollution, Art. VII, Nov. 25, 1987, reprinted in 27 *I.L.M.* 835 (1988) ("Accepting that, in order to protect the North Sea from possibly 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.").

declarations, which are political statements rather than legally binding obligations, emphasize avoiding harm and understanding that action can be taken before all the cause-and-effect relationships are fully understood. Eventually this process of invoking the precautionary principle in Ministerial Declarations led to the inclusion of the principle in the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic.²¹

The Contracting Parties shall apply 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.²²

At a global level, the 1982 World Charter for Nature, which was approved as a UN General Assembly Resolution by 111 countries, endorsed a precautionary principle without explicitly invoking the term.²³ It emphasized preventing environmental

20. Declaration of the Third International Conference on Protection of the North Sea, March 7-8, 1990, reprinted in 1 Yearbook of Int'l Envtl L. 658, 662-73 (1990) ("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 bio-accumulate even where there is no scientific evidence to prove a causal link between emissions and effects.")

21. Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention), 1992. The Convention combines and updates the 1972 Oslo Convention on Dumping Waste at Sea and the 1974 Paris Convention on Land-Based Sources of Marine Pollution. See OSPAR Commission- The OSPAR Convention. Retrieved June 25, 2013, from www.ospar.org/content/content.asp?menu=00340108070000_000000_000000.

22. See Convention for the Protection of the Marine Environment of the North-East Atlantic, art. 2(2)(a), Sept. 22, 1992, reprinted in 32 I.L.M. 1069 (1993) (entered into force March 25, 1998).

23. World Charter for Nature, 11, Oct. 28, 1982, U.N.G.A. Res. 37/7, U.N. Doc. A/Res./37/7 (1982), reprinted in 22 I.L.M. 455 (1983) ("Activities which might have an impact on nature shall be controlled, and the best available technologies that minimize significant risks to nature or other adverse effects shall be used; in

damage, called for shifting the burden of proof to the proponent of potentially harmful activities, and argued for delaying activities where potential threats were not fully understood. It is not, however, a legally binding instrument.²⁴ The first international treaty which refers to the term is the Vienna Convention for the Protection of the Ozone Layer, 1985 (Vienna Convention), which reflected the parties' recognition of the 'precautionary measures' taken at the national and international levels.²⁵ As there was still no scientific certainty on the causes and impacts of ozone depletion at the time of adoption, the Convention's later success was due largely to its precautionary nature.²⁶ Its Montreal Protocol²⁷ which was adopted in 1987 also towed the same line. That paragraph states in part that:

Parties...determined to protect the ozone layer by taking precautionary measures to control equitable total global emissions of substances that deplete it...²⁸

The precautionary principle has been explicitly invoked in international legal instruments since the 1980s. The 1980s and early 1990s saw a process of international consensus building

particular: (a) Activities which are likely to cause irreversible damage to nature shall be avoided; (b) Activities which are likely to pose a significant risk to nature shall be preceded by an exhaustive examination; their proponents shall demonstrate that expected benefits outweigh potential damage to nature, and where potential adverse effects are not fully understood, the activities should not proceed.”).

24. Saladin, C., *Loc. Cit.* (note 21).

25. Convention for the Protection of the Ozone Layer (Vienna), 1985 26 ILM, 1529; Preamble.

26. R. E. Deloso: *The Precautionary Principle: Relevance in International Law and Climate Change*. Thesis. International Environmental Science. Lund University. Sciences, 2005, p. 15. Retrieved July 7, 2012, from http://www.lumes.lu.se/database/alumni/04.05/theses/rabbi_deloso.pdf

27. Protocol on Substances that Deplete the Ozone Layer (Montreal), 1987 26 ILM 154.

28. 1987 Montreal Protocol, Preamble.

around the principle. With the United Nations Conference on Environment and Development (UNCED or the Earth Summit), held in Rio in 1992, the precautionary principle got broader international attention. All of the UNCED documents,²⁹ with the exception of the Forest Principles,³⁰ invoked the precautionary principle.³¹

The core of the principle is reflected in Articles 15 of the Rio Declaration, which provides that:

"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. 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".

The Rio Declaration was not the first multilateral document in which the precautionary principle was appearing. The principle had appeared in many multilateral agreements prior to this date,³² but its appearance in the Rio Declaration signified that the concept had become essential to international environmental policy, gave the principle greater publicity and also emphasized the fact that it had been internationally accepted.³³

29. Declaration on the Environment and Development (Rio) 1992 31 ILM, 874, (hereafter Rio Declaration), the Convention on Biological Diversity 1992 31 ILM, 818, the United Nations Framework Convention on Climate Change 1992 31 ILM, 849 and Agenda 21 1992 UN Doc. A/CONF.151/26 Rev. 1 (Vols I-III).

30. Statement of Principles to Guide the Management, Conservation and Sustainable Development of all Types of Forests (1992) UN Doc. A/CONF.151/26 (Vol. III).

31. Cited in Saladin, C., "Precautionary Principle in International Law" International Journal for Occupational and Environmental Health Vol. 6 No. 3, 2000 pp. 270-273.

32. Though its wordings were not precise or identical in each of those treaties.

33. Smith, C., *op.cit.* (note 2) p. 263.

The precautionary principle is also contained in Chapter 17 of Agenda 21 and it provides as follows:

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, wastes audits and minimization, construction and/or improvement of sewage treatment facilities, quality management criteria for handling of hazardous substances, and a comprehensive approach to damaging impact from air, land and water.³⁴

From the above, it is clear that, the provision is not only a manifest endorsement of the precautionary principle, but it also clearly relates the precautionary concept to a number of specific measures which would enhance precautionary policies with respect to oceans, seas and the marine environment.³⁵ By and large, the precautionary principle has been incorporated in almost every environment-related treaty. Examples include the 1991 Bamako Convention,³⁶ the 1992 Convention on Biological Diversity,³⁷ the 1992 United Nations Framework Convention on Climate Change (UNFCCC),³⁸ the 1994 Convention on

34. Agenda 21, Chapter 17. Agenda 21 was adopted at the Earth Summit 1992 in Brazil by nations representing over 98% of the Earth's population, it is the principal global plan to confront and overcome the economic and ecological problems of the late 20th Century. It provides a comprehensive blueprint for humanity to use to forge its way into the next century by proceeding more gently upon the Earth. As its sweeping programs are implemented world-wide, it will eventually have an impact on every human activity on our planet. Deep and dramatic changes in human society are proposed by this monumental historic agreement.

35. R. E. Deloso: *Loc. Cit.* (note 2).

36. Bamako Convention on the ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (Bamako Convention), 1991 30 ILM, 773, Art. 4(3)(f).

37. This also provided for the application of the precautionary concept.

38. United Nations Framework Convention on Climate Change, Article 3.

International Trade in Endangered Species (CITES) Guidelines,³⁹ the 1995 Straddling Stocks Agreement,⁴⁰ the 2000 Cartagena Protocol on Biosafety.⁴¹

CRITERIA FOR PRECAUTIONARY ACTION

As posited by Sandin, there are three criteria for taking precautionary action: (1) intentionality criterion; (2) uncertainty criterion, and; (3) reasonableness criterion. Firstly, accidental avoidance of known or unknown danger cannot be considered precautionary. There is precautionary action with respect to an activity deemed harmful only if the action is performed with the intention of preventing the specific undesirable event. Thus, there has to be a 'political decision to act or not to act as such, which is linked to the factors triggering recourse to the precautionary principle'.

Secondly, precaution only applies to circumstances involving an unknown or uncertain harm. An example of this is the use of precautionary gears when confronted with an unfamiliar substance which may or may not be toxic. Lastly, an action is precautionary if it meets the reasonableness criterion. For an act to be precautionary, it must be based on reason, and not just on the personal beliefs and convictions of the actor.⁴²

39. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was adopted in 1973. The CITES Guidelines adopted in 1994 provided for a precautionary approach in determining whether species are threatened with extinction or are likely to withstand pressures of trade.

40. Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (Straddling Stocks Agreement, 1995) 34 ILM, 1542. Article 5 and 6 set out principles for the conservation and management of those fish stocks and establishes that such management must be based on the precautionary approach and the best available scientific information.

41. Cartagena Protocol on Biosafety to the Convention on Biological Diversity (2000) 39 ILM, 1027. Article 1 states clearly that the objectives of the protocol must be pursued in accordance with the precautionary approach as stated in Principle 15 of the Rio Declaration on Environment and Development.

42. P. Sandin: *The Precautionary Principle: From Theory to Practice*, (Licentiate Thesis), Stockholm: Kungl Tekniska Högskolan, 2002, p. 7, cited in R. E. Deloso: *Op.Cit.* (note 2) p. 19.

Furthermore, the degree of harm needed to trigger the principle depends on the provisions of the relevant law or treaty. Also, the magnitude of damage is usually inversely proportionate to the likelihood of risk, for precaution to be triggered. Precaution can be recommended when there is a *high* risk of “possible harm”, or when there is a *lower* risk of “serious and irreversible harm.” They are balanced by proportionality. On one hand, whether the likelihood of a risk is high or low, and on the other, whether the magnitude or severity of consequences, should the harm occur, is high or low.⁴³

Aplegate postulates four elements as common to most or all formulations of precaution:⁴⁴

The first is the trigger which is the type of risk or danger to public welfare that justifies regulation of a given sector. The second is the timing. This is the relationship between the trigger and *response*, or in other words, the ‘threshold to action’. It is the core of the precautionary principle. One of the key issues in formulating precautionary timing is the reference paid to the certainty of the trigger, and how the threshold may be constructed to differ for risks that are unknown, as opposed to those that are known. The third is the *regulatory response*. This is a set of potential actions to be

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43. Centre for International Sustainable Development Law. *Principles of International Law Relating to Sustainable Development*. Retrieved July 7, 2012, from http://cisdl.org/public/docs/new_delhi_declaration.pdf. See also Perrez, F. X., “Precaution from Rio to Johannesburg: An Introduction” in Precaution from Rio to Johannesburg: Proceedings of a Geneva Environment Network Roundtable, Geneva: United Nations Environment Programme: Geneva Environment Network & the Swiss Agency for the Environment, Forests and Landscape, 2002 p.5 Cited in J. Hepburn *et al.*: The Principle of Precautionary Approach to Human Health, Natural Resources and Ecosystems- Draft Working Paper, 2005. p.4. Retrieved June 20, 2013 from, www.worldfuturecouncil.org/fileadmin/user_upload/papers/CISDL_P3_PrecutionaryPrinciple.pdf
44. Aplegate, J. S., “The Taming of the Precautionary Principle” William & Mary Environmental Law & Policy Review Vol. 27 No.1 2002, p. 3.

triggered. Its parameters vary greatly across different contexts. It may vary between affirmations compelling positive action (such as use of “best available technology”) and, more classically, negative action including prohibitions or banning of a product or activity. The fourth is *Iteration*. It is the post-regulatory effort to improve the original degree of certainty in the trigger on which an application of the principle is premised. It may involve a mandate for continuing research to better identify the risks, or to convert potential harm into known consequences for any given product, activity, such that regulation premised on precaution would eventually be replaced by regulation premised on factual cost-benefit analysis, and geared to those conditions as they may be established.⁴⁵

REASONS FOR AND ADVANTAGES OF THE PRECAUTIONARY PRINCIPLE

In the words of Smith,⁴⁶ there are fundamental reasons to insist that precaution be at the forefront of policy discussions, though these realities are often given inadequate attention due to their simplicity, on the one hand, and their staggering implications, on the other. They remind us that the body of data that we *don't* know about chemicals dwarfs what we *do* know.

Some examples include:

45. *Ibid.*

46. Smith, C., “The Precautionary Principle and Environmental Policy Science, Uncertainty and Sustainability” *International Journal for Occupational and Environmental Health* Vol. 6 No.3.2000p. 263 at 264. Also, R. E. Deloso: *The Precautionary Principle: Relevance in International Law and Climate Change*, Thesis. International Environmental Science. Lund University. Sciences, 2000, p. 15. Retrieved July 7, 2012, from http://www.lumes.lu.se/database/alumni/04.05/theses/rabbi_deloso.pdf.

- (a) The blanketing of earth with man-made chemicals is an unprecedented event in human history. There is no "control group" free of exposures on which to base assurances of safety, and we cannot predict the long range effects on the current test group of 6 billion individuals;
- (b) The long-term health and environmental impacts of the great majority of individual chemicals have not been studied;
- (c) Even in the case of the most dangerous and persistent chemicals, the worldwide volume of production and use cannot be accurately determined. Industries have retained the right to withhold production and trade figures as "confidential business information";
- (d) For obvious reasons, pre-market testing of pesticides and industrial chemicals on human subjects is not acceptable;
- (e) Real-world variables, such as individual sensitivity and the synergies and interactions of multiple exposures, are limitless. It will never be possible to evaluate all possible cause-effect relationships;
- (f) The data provided to support the introduction of chemicals into the marketplace (and the environment) are generated by chemical manufacturers. Government regulators do not conduct independent testing.⁴⁷

In addition to the above reasons, there are other advantages of the precautionary principle. One of such is that precaution responds to an important problem in decision-making, namely, the absence of complete scientific information concerning the environmental consequences of a particular activity. If decisions are made based only on available information, it is highly likely that they will damage the environment, perhaps severely or irreparably. Because the impetus for economic development tends to be strong, the environment has been protected only to the extent that scientific information exists. Consequently, precaution

47. *Ibid.*

has received widespread support by the international community as a valuable tool to integrate development- both economic and social- with environmental protection⁴⁸.

Another key advantage is the fact that, in its strongest form, the precautionary principle may entail a reversal of the onus of proof vis-à-vis the potential polluter and the State whose territory may be polluted. In other words, the polluter must demonstrate that the activities he proposes will not cause harm to the environment, instead of the State's demonstrating that they will cause such harm.⁴⁹ In addition, the principle expands the important role of scientists in the protection of the environment. Thus, the decision-makers must adopt measures based upon a general knowledge of the environment and the problems its protection raises, and like in all environmental matters, the public must support the decision. It is however the duty of the scientists to provide general environmental education, not only for the public, but also for these decision-makers.

DEBATES ON AND RESPONSES TO CRITICISMS OF THE PRECAUTIONARY PRINCIPLE

Without doubt, the precautionary principle has and continues to generate debates as to its meaning and effect. On the one hand, some consider that it provides the basis for early international legal action to address highly threatening environmental issues such as ozone depletion and climate change.⁵⁰ The Alliance of Small Island States (AOSIS) countries so strongly lent their

48. A. Trouwborst: Evolution and Status of the Precautionary Principle in International Law, The Hague: Kluwer Law International cited in Centre for International Sustainable Development Law "Principles of International Law Relating to Sustainable Development" 2002. Retrieved July 7, 2012 from http://cisdl.org/public/docs/new_delhi_declaration.pdf.

49. J. Thornton & S. Beckwith: Environmental Law, London: Sweet and Maxwell, 1997, p. 38.

50. See e.g. the support for the precautionary principle by low-lying AOSIS (Alliance of Small Island States) countries in the climate change negotiations. Statement to the Plenary Session of the INC/FCCC, 5 February 1991, p. 3, cited in P. Sands: *op.cit.* (note 5) p. 267.

support for the precautionary principle in the climate change negotiation. They put their concerns thus:

For us the precautionary principle is much more than a semantic or theoretical exercise. It is an ecological and moral imperative. We trust the world understands our concerns by now. We do not have the luxury of waiting for conclusive proof, as some have suggested in the past. The proof, we fear, will kill us.⁵¹

On the other hand, its opponents have decried the potential which the principle has for over-regulation and limiting human activity. Nevertheless, in view of the fact that damage to the environment is largely serious and mostly irreversible, the principle has been encouraged. Below are some of the criticisms of the precautionary principle and some of the responses which have been given to them.⁵²

The most common criticism of the precautionary principle is often that the precautionary principle has been defined in many ways, thus, it means whatever its proponents want it to mean in a given context, and that it is therefore useless as an overarching guide to policy decisions. The critics cite dozens of versions of

51. Ambassador Robert van Lierop, Permanent Representative of Vanuatu to the UN and Co-Chairman of Working Group 1 of the (Intergovernmental Negotiating Committee for a Framework Convention on Climate Change (INC/FCCC), Statement to the Plenary Session of the INC/FCCC, 5 February 1991, p. 3, cited in P. Sands: *op.cit.* (note 5), 2003, p. 267.

52. On criticisms of the precautionary principle and responses, see Raffensperger, C. et al., "Precaution: Belief, Regulatory System, and Overarching Principle" *International Journal for Occupational and Environmental Health*. Vol. 6 No.3. 2000p. 266 at 268. Cf. J. Tickner & C. Raffensperger: *The Precautionary Principle in Action- A Handbook*. 1998, pp. 16-17. Retrieved July 7, 2012 from <http://www.biotech-info.net/handbook.pdf>.; Myers N., *Debating the Precautionary Principle* pp.1-5. Retrieved June 20, 2013, from www.environmentalcommons.org/precaution-debating.pdf.; Contra, C.R. Sunstein, C. R., "Beyond the Precautionary Principle" *University of Pennsylvania Law Review* Vol. 151 No. 1003. 2003, p. 1003 at 1004-1035.

the precautionary principle⁵³ to support that view. In response to that, it has been argued that despite variations in the wordings, all versions of the precautionary principle acknowledge the need for precautionary action when there is some evidence of the potential for serious, irreversible, widespread harm from some proposed activity, despite scientific uncertainty.⁵⁴

For example, the 1998 Wingspread Statement on the Precautionary Principle summarizes the principle this way: When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.

The Wingspread Conference on the Precautionary Principle was convened by the Science and Environmental Health Network. The February 2, 2000 European Commission Communication on the Precautionary Principle has noted that: The precautionary principle applies where scientific evidence is insufficient, inconclusive or uncertain and preliminary scientific evaluation indicates that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the high level of protection chosen by the EU.

The January 29, 2000 Cartagena Protocol on Biosafety states that:

Lack of scientific certainty due to insufficient relevant scientific information ... shall not prevent the Party of import, in order to avoid or minimize such potential adverse effects, from taking a decision, as appropriate, with regard to the import of the living modified organism in question." The 1992 Rio Declaration on Environment and

53. For example, the 1998 Wingspread Statement on the Precautionary Principle summarizes the principle.

54. N. Myers, *Debating the Precautionary Principle* p.1-5. Retrieved June 20, 2013, from www.environmentalcommons.org/precaution-debating.pdf. 2.

Development provides thus: "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.

Other criticisms focus on how and where the precautionary principle is applied. Some critics argue that risk assessment makes the precautionary principle unnecessary. They say risk assessment is based on sound science and is inherently protective because it builds in conservative assumptions and safety factors. They insist that the precautionary principle, by contrast, is not science-based and that it raises unfounded fears based on tentative evidence. Some argue, on the other hand, that the precautionary principle applies only to major threats of harm involving large uncertainties and does not apply to small or known risks. Unfortunately, some of these arguments stem from outright opposition of the precautionary principle, or the wish to limit it to a very narrow range of applications. Official statements of the United States and the European Union alike have yet to acknowledge precaution as a broad, overarching approach. Often, attacks on the precautionary principle are actually attacks on 'precautionary action', or on actions critics assume will result from applying the principle. What the critics do not realize, or refuse to admit however, is that precaution as a principle allows for a broad range of actions. The principle requires explicit consideration of the kind and degree of potential harm, along with the degree of uncertainty about the likelihood of harm, before deciding how to act. For small risks, application of the precautionary principle would permit policies that are much less restrictive than if the potential for serious, irreversible harm were real but unquantifiable. The prescriptive aspect of the principle is that it requires consideration of potential harm and uncertainty.

But it does not prescribe specific actions. Policy decisions must be made case by case.⁵⁵

On another front, critics often assemble a list of adverse effects that might result if the principle were to be applied. The critics argue, for example, that it is impossible to prove that a proposed activity will be safe and, therefore, all innovation will be stifled. It is also argued that alternatives to a proposed activity may carry risks and that applying the precautionary principle is likely to cause more worry about possible risks than about known harmful activities. As sound as these arguments may seem, they are again based on narrow assumptions about actions required by the principle in the case of policy decision-making. As a broad, overarching principle, precaution requires evaluating alternatives as stringently as any proposed activity. It requires monitoring initiated activities where the possibility of serious harm remains so that warning signs can be detected. The precautionary principle does not stifle science and innovation but actually supports more science rather than less. It requires larger analyses than narrowly conceived risk assessments. It requires the need to ask whether a proposed activity is necessary, and, if so, whether other ways exist to meet the same goal.⁵⁶

Also, critics argue that the precautionary principle, if widely adopted, will be used as a trade-protectionist measure that is, as a cover for erecting barriers to free trade in order to protect jobs or markets at home. In response to this, it is perfectly conceivable that a country might want to set higher standards for legitimate reasons. Some communities and cultures are more inclined to act in a precautionary way than others. To deny such communities this right is to impinge upon national sovereignty. Although

55. On criticisms of the precautionary principle and responses, see Raffensperger, C., *et al.*, "Precaution: Belief, Regulatory System, and Overarching Principle" *International Journal for Occupational and Environmental Health* Vol. 6 No.3 2000 p. 266 at 268. Cf. J. Tickner & C. Raffensperger: *The Precautionary Principle in Action- A Handbook*, 1998, p. 16-17. Retrieved July 7, 2012 from <http://www.biotech-info.net/handbook.pdf>.

56. Raffensperger, C., *et al.*, *Ibid.*

misuse of the principle is possible, it is important to recognize that there is no single right way to deal with threats of significant harm in the face of scientific uncertainty. National protective standards that are applied consistently internally and externally should prevail.⁵⁷

Critics have also argued that the principle is emotional and irrational. In response, it has been argued that because we are human, thinking about babies born with toxic substances in their bodies tugs at our emotions. Caring about future generations is an emotional impulse. However, these emotions are not irrational; they are the basis for human survival. Precaution is a principle of justice that no one should have to live with fear of harm to their health and environment. Decision-making about health is not value-neutral. It is political, emotional, and rational. Not taking precautions, on the other hand, seems irrational.⁵⁸

In addition, critics have also argued that the principle costs too much and may lead to bankruptcy. In response to this, there is more reason to believe that precaution will increase prosperity in the long run, through improved health and cleaner industrial processes and products. The skyrocketing costs of environmental damage, health care from pollution, and pollution control and remediation are rarely included in estimates undertaken when precautionary action is advocated. Despite initial outcries about precautionary demands, industries have been able to learn and innovate to avoid hazards. In the area of pollution prevention, thousands of companies have saved millions of dollars by exercising precaution early, before proof of harm. These companies and governments that act similarly become leaders in their field when firmer proof of harm comes along. In taking precaution, however, plans should be made to mitigate immediate adverse economic impacts. Transition planning pulls together different sectors of society to ensure that precautionary action has

57. *Ibid.*

58. J. Tickner & C. Raffensperger: *The Precautionary Principle in Action: A Handbook*, 1998, p. 16-17. Retrieved July 7, 2012 from <http://www.biotech-info.net/handbook.pdf>.

as few adverse side-effects as possible. Precaution is practiced by setting societal goals, such as, that children be born without toxic substances in their bodies, and then determining how best to achieve that goal.⁵⁹

Finally, critics have argued that applying the precautionary principle would amount to banning all chemicals which would halt development and send mankind back to the Stone Age. However, a thorough understanding of the precautionary principle would reveal that precaution does not take the form of categorical denials and bans. It does redefine development, not only to include economic well-being but also ecological well-being, freedom from disease and other hazards. The idea of precaution is to progress more carefully than has been done before. It would encourage the exploration of alternatives, better, safer, cheaper ways to do things, and the development of cleaner products and technologies. Some technologies and developments may be brought onto the marketplace more slowly. Others may be phased out. Those proposing potentially harmful activities would have to demonstrate the safety and necessity of these activities up front. On the other hand, there will be many incentives to create new technologies that will make it unnecessary to produce and use harmful substances and processes. With the right signals, it will become possible to innovate to create development that takes less of a toll on the human health and environment.⁶⁰

From the above exposition, it is indeed true that the evolution of the precautionary principle at the international level has been

59. *Ibid.*

60. *Ibid.* For details on criticisms of the precautionary principle and responses, see Raffenperger, C., *et al.*, "Precaution: Belief, Regulatory System, and Overarching Principle" *International Journal for Occupational and Environmental Health* Vol. 6 No.3 2000 p. 266 at 268 *Cf.* J. Tickner & C. Raffenperger: *The Precautionary Principle in Action- A Handbook*, 1998, p. 16-17. Retrieved July 7, 2012 from <http://www.biotech-info.net/handbook.pdf>; N. Myers: *Debating the Precautionary Principle* pp.1-5. Retrieved June 20, 2013, from www.environmentalcommons.org/precaution-debating.pdf. *Contra* Sunstein, C. R., "Beyond the Precautionary Principle" *University of Pennsylvania Law Review* Vol. 151 No. 1003, 2003, p. 1003 at 1004-1035.

slow, because international law making requires negotiation and agreement among over 100 countries. Since the Earth Summit, however, the precautionary principle has evolved from being a broad statement of principle, usually found in the preamble of an agreement, and has now begun to acquire greater content and to move into the operative articles of legally binding international agreements.

CONCLUSION

It is evident that the precautionary principle is very important if environmental protection is to be achieved at global and local levels. The current generally high level of environmental degradation can hardly be isolated from failure to apply the principle of precaution in the processes of development in the past decades, especially in respect of carbon emission. Worse still, failure to apply the principle of precaution for the prevention of serious or irreversible damage to the environment in future developments, has the potential to aggravate already existing signs of grave danger and damage, including more intense weather conditions, flooding, desertification, scarcity of portable water and food, increase in disease vectors and resultant poorer and less healthy populations. This article has considered the three criteria for precautionary action, namely intentionality; uncertainty, and reasonableness criteria and found that it is reasonable to intentionally apply precaution in the prevention of an environmental damage; even when full scientific proof is uncertain or yet to be established. It recommends that precaution should be preferred as a "better-safe-than-sorry" approach, in contrast to the traditional reactive "wait-and-see" approach to environmental protection. It is also recommended that all legislations for the purpose of environmental protection should provide for the requirement of application of precaution in all projects that affect the environment in whatever measure.