The Precautionary Principle:

PERSPECTIVES INVOLVING HUMAN HEALTH ASPECTS AND ENVIRONMENTAL POLLUTION

Aldo Pacheco Ferreira*

Fecha de recepción: 07-03-07 . Fecha de aceptación: 24-05-07

Abstract

It's presented reflections and questions involving environmental perspectives, public health and, anthropogenic actions related to the crescent consume instigated by the modern world. The precautionary approach arises from recognition of the extent to which scientific uncertainty and inadequate evaluation of the full impacts of human activities have contributed to ecological degradation and harm to human health. It can be used to help address these circumstances, bringing together ethics and science, illuminating their strengths, weaknesses, values, or biases. The discussion here proposed can contribute as a guide in evaluation the impacts provoked by human activities at the environment and provide a framework for protecting the public health, and life-sustaining ecological systems now and for future generations.

Key words: Precaution, public health, human activities, environmental pollution, ecosystem, risk

Resumen

En este artículo se presentan reflexiones y preguntas que tienen que ver con la perspectiva ambiental, la salud pública y las acciones antropogénicas relacionadas con el aumento de consumo estimulado por el mundo moderno. Asimismo, se presenta un acercamiento preventivo sobre el reconocimiento del grado en que la incertidumbre científica, además de la evaluación inadecuada de todos los impactos de las actividades humanas, ha contribuido a la degradación ecológica y al daño de la salud humana. Este trabajo puede ser utilizado para ayudar a abordar estas circunstancias, reuniendo la ética y la ciencia, iluminando sus fuerzas, debilidades, valores, o vertientes. La discusión aquí propuesta puede servir como guía en la evaluación de los impactos provocados por las actividades humanas en el ambiente y proporciona un marco para proteger la salud pública, además de los sistemas ecológicos que sostienen la vida ahora y para las generacion es futuras.

Palabras clave: precaución, salud pública, actividades humanas, contaminación ambiental, ecosistema, riesgo.

* Título en ciencias biológicas, Universidade Gama Filho, 1982; magíster en ingeniería biomédica (COPPE/UFRJ) 1996 y doctorado en ingeniería biomédica (COPPE/UFRJ), 2000; actualmente es investigador en la Escuela Nacional de Salud Pública Sérgio Arouca/Fiocruz, y coordinador adjunto en el programa de posgrado en salud pública y ambiente en la misma institución; correo electrónico: aldoferrreira@ensp.fiocruz.br

Introduction

The precautionary principle is a guide to public policy decision making. It responds to the realization that humans often cause serious and widespread harm to people, wildlife, and the general environment. According to the precautionary principle, precautionary action should be undertaken when there are credible threats of harm, despite residual scientific uncertainty about cause and effect relationships. Additionally, should be considered within a structured approach to the analysis of risk which comprises three elements: risk assessment, risk management, risk communication. The precautionary principle is particularly relevant to the management of risk (Tallacchini, 2005; Vineis, 2005; Dorman, 2005).

Pollution prevention means the use of processes, practices, materials, products or energy that let alone or minimize the creation of pollutants and waste, and reduce the overall risk to the environment and human health (Tickner, Geiser, 2004). It shifts the focus of environmental protection from end-of-pipe reactive control, where pollution is managed after it is created, to front-of-process, where preventive measures are adopted. Additionally it makes economic sense, because to pollute means inefficient use of energy and materials, wasting natural resources and relying on subsidies to cover the social cost resulting from polluting water, air, soil, etc. With issues such as hazardous waste, acid rain, the depletion of the ozone layer, the greenhouse effect, and the scarcity of air and water more urgent than ever, it is not surprising that the global community has begun to question and reassess the basic elements of industrial production as an underlying cause of these environmental atrocities (Som, Hilty, Ruddy, 2004; Ellis, 2003; Rogers, 2003).

What is the Precautionary Principle?

The precautionary principle was first mentioned at the Second International Conference on the Protection of the North Sea (1987). In this manner, it effectively shifted the burden of proof from the regulatory authority to the polluters. However, the principle was only codified for the first time at the global level in Principle 15 of the 1992 Rio Declaration on Environment and Development, which stated that "where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation" (Heazle, 2006).

Intrinsic to the precautionary principle is an express rejection of a focus on the assimilative capacity of the environment, which heretofore held sway in the arena of international environmental decision-making (Snell, Cowell, 2006). The assimilative capacity concept emphasizes the ability of scientists to use predictive modelling to accurately ascertain the carrying capacity of, and the magnitude of threats to, the environment, as well as society's technological capacity to mitigate such threats once detected. It also presumes that there is sufficient time to act to avoid harm from such threats once they have been detected (Karlsson, 2006).

The precautionary concept advocates a shift away from the primacy of scientific proof and traditional economic analyses that do not account for environmental degradation (Tallacchini, 2005; Turvey, Mojduzka, 2005). Instead, emphasis is placed on: (i) the vulnerability of the environment; (ii) the limitations of science to accurately predict threats to the environment, and the measures required to prevent such threats; (iii) the availability of alternatives (methods of production and

products) which permit the termination or minimization of inputs into the environment; and (iv) the need for long-term, holistic economic considerations, accounting for, among other things, environmental degradation and the costs of waste treatment.

The precautionary principle can also be viewed as a safeguard against the opportunism of decision-makers in situations of asymmetric information or imperfect monitoring by society (Dupuy, Grinbaum, 2005). In the context of management and conservation of wildlife species, the principle reflects the recognition that scientific understanding of ecosystems is complicated by a host of factors, including complex and cascading effects of human activities and uncertainty introduced by naturally chaotic population dynamics.

The precautionary principle has been characterized as a public policy guideline for environmental issues which ensures that a substance or activity posing a threat to the environment is prevented from adversely affecting the environment, even if there is no conclusive scientific proof linking that particular substance or activity to environmental damage (Dorman, 2005; Rogers, 2003; Karlsson, 2006).

The Principle is premised on four basic assumptions: (i) there is a threat of harm, either credible or known; (ii) the situation presents a lack of scientific certainty or evidence; (iii) cause and effect relationships are not yet proven; and (iv) there is a necessity or duty to act.

Precaution and the survival threshold

Increasingly, there has been a growing international consensus around the need to reconsider the conventional approaches to environmental regulation and management (Heazle, 2006; Dupuy, Grinbaum, 2005). Pollution prevention strategies have been replacing more conventional pollution control ones. Whether referring to the clean technology or the precautionary principle, the concept remains the same for all: sustainable industrial practices that can be implemented without posing undue environmental risks now or in the coming decades.

Even though the concept is constantly developing, there are six basic concepts now enshrined in the precautionary principle (Tallacchini, 2005; Vineis, 2005; Ravetz, 2004). They are as follows:

- Preventative anticipation: calls for willingness to take action in advance of scientific proof if it is deemed that an action will be too costly in the future.
- Safeguarding of ecological space: involves deliberately holding back from possible but undesirable resource use in order to widen the assimilative capacity of natural systems.
- Proportionality of response or cost effectiveness of margins of error: used to show that the degree of restraint is not too costly if there is a great danger of future life support capacities being unduly undermined.
- Duty of care or onus of proof on those who propose change: stresses formal duties of environmental care and strict liabilities for damages while also encouraging innovative but safer technology management and practices. The burden of proof, under this concept, shifts onto those who propose to alter the status quo, rather than simply expecting victims subsequently to seek compensation for damages.
- Promoting the cause of intrinsic natural rights of an ecological system to allow it to function in a manner that will maintain

essential support for all life on earth in the long run.

- Paying for past ecological debt: calls on those who have already created large ecological burdens to compensate for their past errors of judgement.

The common sense of survival and perception of risk

The precautionary principle has always been a part of survival algorithms of small farmers in developing societies particularly in risk prone environments such as drought, flood prone areas, mountainous and forest regions (Weiss, 2006; García, Kevany, Huisingh, 2006; Larsen, Lienert, Joss, Siegrist, 2004). However, the farmers always manage risk aversion in certain markets by taking extreme risks in other resource markets as a part of their portfolio strategies depending upon the access, assurances, and abilities commanded by them. The issue therefore is to understand how households survive by taking risks in a manner that they not only cope with the consequences but also improve their capacity to deal with uncertainties in future.

It is known that every year over 90 million people are added to the global population. We know the resources we have are not infinite and can tolerate only so much stress. What we do not know is whether there is sufficient political will, to move beyond de clarations of good intentions and to start implementing sustainable development globally in Brazil. With almost 8 billion inhabitants living on this planet today and a population expected to double in this century, we must also act on behalf of future generations and leave for them clean and plentiful natural resources. It's necessary that we be aware of the effects of over consumption, waste disposal, and many forms of energy production on human health, the environment and the economy. Then, on the way in the direction of sustainability, pollution prevention is a factor of supreme importance.

As we become more aware of the global environmental stresses and strains, it is easy to see that humanity is in trouble. Up to 10,000 people die daily because of avoidable environmental in their daily lives. It is necessary for collective action by every nation state and every global citizen to safeguard the global commons (Dorman, 2005; Rogers, 2003; Heazle, 2006). In addition, since not all countries are in a position to play an equal part as protector, precaution must be employed as facilitator in devices to help the strong to assist the weak in the common cause of survival. It is imperative that both governments and industries alike take a stronger stand to protect and rejuvenate the earth's diminishing resources in order to preserve a safe and secure future for the generations to come.

How do we ensure that the trade off between known negative externalities caused by use of chemical pesticides and other inputs vis-à-vis some of the unknown externalities likely to be caused by use of bio pesticides or transgenic crops? Is it necessarily ethical to avoid taking risks and subject societies to suffer deprivation merely because of some risks, which are not completely quantifiable? Should we reduce the risks by getting location specific testing done in each country under rigorous conditions and with all the risks fully disclosed? Each country should have the choice to decide whether the risk is worth taking or not.

Once the level of risk is mutually agreed upon after prior informed consent, the responsability of the global community is to ensure that a proper support system is available to safeguard the interests of technologically backward countries if such a need arises (Karlsson, 2006).

The precautionary principle is a valid means of generating responsibility in taking risks. It is not a means to prevent recognition and calibration of the risk. Once the risks are calibrated, it will depend upon the specific socio-economic conditions and cultural milieu, which will determine how much risk, is acceptable at what stage of economic development and with what consequences. Currently, concern with unknown risks is not matched with responsibility for known consequences of chemical pesticides and other environmental risks such as excessive extraction of ground water, decline in biodiversity, etc. (Weiss, 2006; García, Kevany, Huisingh, 2006).

There are several issues in this debate which have remained obscure. For instance, how to link ethical issues in poverty alleviation with ethical concerns in using or not using risky technologies with suspected environmental impacts; similarly how to deal with the risks that are known but are not attended to adequately; what is ethical basis of differential norms of disclosure by the same corporation in developed countries vis-à-vis developed countries; how do we deal with ethical basis of not allocating sufficient research resources to tackle the problems of low productivity in rainfed regions; how to deal with anxieties and fears generated by the larger corporate control of biotechnological research which has not been the case in conventional research; what are the peculiarities of processing complex information in dealing with biotechnological risks compared to other kinds of risks.

Discussion and Conclusion

An approach to evaluate the risks on ethical, economic, equity and environmental grounds taking into account the prior experience in dealing with different kinds of technologies in a given society is needed. The question is whether the precautionary principle is better used as a tool with which to stop uncharted action or as a motivation by which to chart those actions contemplated or taken.

Thus, risk taking as an input into capacity building for dealing with bigger risks or uncertainties requires a different way of thinking compared to the choice of risk at a level of survival threshold. Survival threshold is the limit within which risks are taken. Occasionally farmers gamble, just as countries and corporations do. What we have to see is whether the gamble is worth it, what are the possible consequences for human health and life, dignity and ultimately for the ecosystem health.

Both government and industry must accept that all people and all organizations have a duty to care for the earth, that business ethics should be governed by wider social and environmental ethics, and that the environment, not industry, determines the limits of tolerance of ecosystems. Both states and industries are urged to go beyond compliance with existing regulations and adopt the practices and technologies that achieve maximal ecoefficiency.

Environmental researches have the conceptual capacity to plan for future generations. Also have the ability to act in a thoughtful way taking into account the needs of those who, after us, will inhabit in larger numbers this beautiful spaceship and depend on its natural resources for their well-being. One thing is clear: we do not have much time and we still have a long way to go, if we are to place ourselves on a sustainable path.

References

Dorman P Evolving knowledge and the precautionary principle in Ecol Economics. 2005; 53(2): 169-176.

Dupuy JP, Grinbaum A Living with uncertainty: from the precautionary principle to the methodology of ongoing normative assessment in Comptes Rendus Geosciences. 2005; 337(4): 457-474.

Ellis DV The precautionary principle and environmental monitoring in Marine Pollut Bull. 2003; 46(8): 933-934.

García FJL, Kevany K, Huisingh D Sustainability in higher education: what is happening? in J of Cleaner Production. 2006; 14(9-11): 757-760.

Heazle M Lessons in precaution: The International Whaling Commission experience with precautionary management in Marine Policy. 2006; 30(5): 496-509.

Karlsson M Science and norms in policies for sustainable development: Assessing and managing risks of chemical substances and genetically modified organisms in the European Union in Regulatory Tox and Pharmacol. 2006; 44(1): 49-56.

Larsen TA, Lienert J, Joss A, Siegrist H How to avoid pharmaceuticals in the aquatic environment in J of Biotech 2004; 113(1-3): 295-304.

Ravetz J The post-normal science of precaution in Futures. 2004; 36(3): 347-357.

Rogers MD Risk analysis under uncertainty, the Precautionary Principle, and the new EU chemicals strategy in Regul Tox and Pharm. 2003; 37(3): 370-381.

Snell T, Cowell R Scoping in environmental impact assessment: Balancing precaution and efficiency? in Environ Impact Assessment Rev. 2006; 26(4): 359-376.

Som C, Hilty LM, Ruddy TF The precautionary principle in the information society in Human and Ecol Risk Assess. 2004; 10(5): 787-799.

Tallacchini M Before and beyond the precautionary principle: Epistemology of uncertainty in science and law in Toxicol and Applied Pharm. 2005; 207 (2 Suppl 1): 645-651.

Tickner JA, Geiser K The precautionary principle stimulus for solutions- and alternatives-based environmental policy in Environ Impact Assess Rev. 2004; 24(7-8): 801-824.

Turvey CG, Mojduszka EM The Precautionary Principle and the law of unintended consequences in Food Policy. 2005; 30(2): 145-161.

Vineis P Scientific basis for the Precautionary Principle in Toxicol and Applied Pharm. 2005; 207 (2 Suppl 1): 658-662.

Weiss NS When can the result of epidemiologic research not eliminate the need to invoke the Precautionary Principle? in J of Evidence Based Dental Pract. 2006; 6(1): 16-18.