PUBLIC HEALTH AND ENVIRONMENTAL POLLUTION: PRECAUTIONARY PARADIGMS

Saúde pública e poluição ambiental: paradigmas precautórios

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RESUMO

Objetivos: Apresentar reflexões envolvendo perspectivas ambientais, saúde pública e ações antropogênicas relacionadas ao crescente consumo decorrente do modernismo instaurado no mundo. **Síntese de dados**: O paradigma precautório surge como constatação e reconhecimento propiciado pelas incertezas científicas e avaliação inadequada dos impactos das atividades humanas que contribuíram para a degradação ambiental e prejudicaram a saúde humana. Tendo como base o princípio da precaução, discutiremos tais vertentes aqui sinalizadas, concatenando estas circunstâncias, reunindo ética, ciência, forças, fraquezas, valores e saúde. A discussão aqui proposta pretende contribuir como um guia em avaliação aos impactos provocados por atividades humanas no ambiente e alicerçar questões mais extremas para proteção da saúde pública e da sustentabilidade dos ecossistemas, para agora e para gerações futuras**. Conclusão**: Tanto o governo quanto a indústria devem aceitar o fato de que todas as pessoas e organizações têm o dever de cuidar da Terra; que a ética no serviço deveria ser regulada por uma ética social mais ampla, e que o meio ambiente, não a indústria, determina os limites de tolerância dos ecossistemas. Tanto os estados como as indústrias são chamadas a irem além da conformidade com as regulamentações existentes e adotar práticas e tecnologias que alcancem o máximo de eco-eficiência.

Descritores: Precaução; Saúde Pública; Atividades Humanas; Poluição Ambiental; Ecossistema; Controle de Risco

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ABSTRACT

Objective: *To present thoughts involving environmental perspectives, public health and antropogenic actions related to the increasing consumption due to the modernism established in the world.* ***Data synthesis:*** *The precautionary paradigm appears as the confirmation and recognition provided by scientific uncertainties and inadequate evaluation on the impact of human activities that contributed to the environment degradation and that damaged human health. Based on the principle of precaution, we will argue upon such matters here signalized, correlating these circumstances, joining ethics, science, strengths, weakness, values and health. The aim of the here proposed argumentation is to contribute as a guide for the evaluation of the impacts caused by human activities in the environment and to base more extreme questions for the protection of both public health and the ecosystems' sustainability, for now and for future generations.* ***Conclusion:*** *Both government and industry must accept that all people and organizations have the duty to care for the Earth; that business ethics should be ruled by a wider social and environmental ethics, and that the environment, not the industry, determines the limits of the ecosystems' tolerance. Both states and industries are urged to go beyond compliance with existing regulations and adopt the practices and technologies that achieve maximal eco-efficiency.*

Descritores: *Precaution; Public Health; Human Activities; Enviromental Pollution; Ecosystem; Risk Control.*

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INTRODUCTION

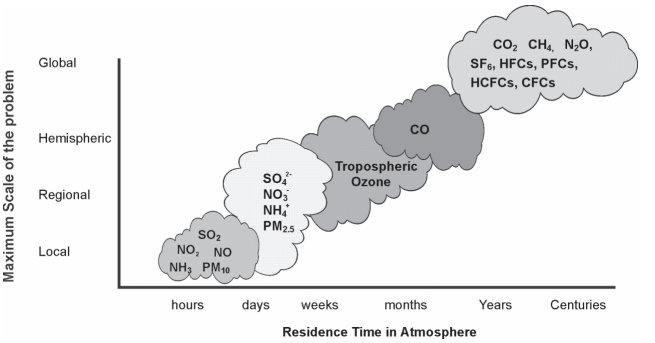
The world is presently facing an unprecedented health and environmental crisis. Although progress in both the health and the environment fields, the circumstances is approaching the brink of global disaster. So extensive and far-reaching are the problems that the future well-being of humanity, together with that of many other life forms on the planet, is in risk.

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[1-3].

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[4]. 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[5-7].

The atmospheric problems highlighted by the Brundtland Commission still exist, although efforts have been made at various scales and with different efficacy to tackle them. Different primary pollutants emitted and secondary pollutants formed in the atmosphere have very different residence times in the atmosphere and this affects the scale at which their impact is felt (**Figure 1**). Those gases that have very short residence times affect indoor and local air quality. Substances with residence times of days to weeks give rise to local and regional problems, from weeks to months giving rise to continental and hemispheric problems and those with residence times of years give rise to global problems. Some anthropogenic substances have extremely long residence times and may last up to 50 000 years after being emitted to the atmosphere.

Figure 1. Selected pollutants, their average residence times in the atmosphere and maximum spatial extent of their impact in different compartments in the environment.



Climate Change and Stratospheric Ozone

Stratospheric ozone depletion and global warming share many common physical and chemical processes. Many categories of ozone depleting substances, and several of their substitutes are, just like the Chlorofluorocarbons (CFCs), greenhouse gases and contribute to climate change. The efforts undertaken under the Montreal Protocol have reduced the atmospheric abundances of CFCs, but global observations confirm increasing atmospheric concentrations of some of the common CFC alternatives such as hydrochlorofluorocarbons (HCFCs). Overall, the understanding of the impact of stratospheric ozone depletion on climate change has been strengthened although there are still many aspects of these complex systems where knowledge is lacking. The same is true for the effects of climate change on stratospheric ozone recovery. Different processes are simultaneously acting in different directions. Climate change is projected to lead to stratospheric cooling, which in turn is predicted both to enhance ozone concentrations in the upper stratosphere but at the same time delay ozone recovery in the lower stratosphere. The net effect of these two processes is not possible to predict at this stage[8].

The current air pollution situation presents a mixed picture of successes and unresolved issues[9]. Urban air pollution in the high income countries has reduced and the impacts on human health have been decreased. However, even in these cities new evidence shows that air pollution remains one of the major causes of impaired health. Some regional air pollution issues have been successfully

addressed such as deposition of acid rain in Europe, but regional air pollution is increasing in many other continents. Tropospheric ozone has emerged as a particularly intractable problem in the northern hemisphere affecting crops and health. Particulate matter pollution, dramatically affecting human health is far from being solved. The use of biomass fuels indoor in Latin America, Africa and Asia imposes an enormous burden of disease on poor families, especially women and young children, and is inextricably linked to poverty. Responses to this challenge has been inadequate to date, but offer the opportunity to improve human well being and alleviate poverty and improve health for the poorest families in the world.

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"[10].

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[11]. 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[12].

The precautionary concept advocates a shift away from the primacy of scientific proof and traditional economic analyses that do not account for environmental degradation[1,13]. 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[14]. 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[3,9,12].

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 [10,14]. 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[1,2,15]. 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[16-18]. 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 declarations 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[3,9,10]. 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 responsibility 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[12].

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[16-18].

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.

The environmental movements need therefore to place their environmental struggles much more clearly within an overall context of health and social justice for all. This would also be purposefully sensible as people are usually deeply concerned with their own and their families' health. It is to be hoped that environmentalists will increasingly regard the struggles for health as an integral part of their own struggles.

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