

The precautionary principle and its underestimated adverse effects: economic, health and environmental risks

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The precautionary principle is often put forward to impose bans in a growing number of areas. It is used to justify various government interventions in the economy. These "precautionary" interventions lead to various adverse effects, however. They are ineffective from an economic standpoint. Worse yet, far from reducing risk, they often prove to be hazardous for health and the environment.

A recent report from the European Environment Agency recognizes that there exist "false positives." These involve public measures implemented in the absence of any real risk.¹

But looking only at a few instances of "false positives" amounts to disregarding the most significant costs of the precautionary principle. The outcome is far from trivial. It includes, in particular, greater legal insecurity for the economy and for innovation in the marketplace. To this must be added dangers to consumers due to the disappearance of benefits from banned products. Also, new technologies promoted and subsidized by governments in the name of precaution create new risks that may be quite substantial.

PROLIFERATION OF PRECAUTIONARY INTERVENTIONS AND LEGAL INSECURITY

The culture of "precautionism" has spread in recent decades due in particular to political recognition of the "precautionary principle" (PP). It has taken an increasing place in official documents at the national and international levels since the early 1990s (as in the Rio Declaration or its incorporation in the Maastricht Treaty). In France, it appears in the Barrier Law of 1995 and has been an integral part of the Constitution since 2005.

Without a universally accepted definition of this principle even today, its initial goal was to allow for a product or technology to be banned in case there was a risk of irreversible damage to the environment, even in the face of scientific uncertainty.

Since its early days, PP has become ubiquitous, for a number of reasons.

While PP's initially stated goal was to allow for policy decisions regardless of prevailing scientific uncertainty, such uncertainty has become the main justification for public intervention. It is a

sort of universal catch-all for policies aimed at banning any product at all, even if there exists a scientific near-consensus regarding its harmlessness under actual conditions of use.

One emblematic example is that of electromagnetic waves. The French government is considering restrictions on relay antennas,² despite scientific opinion and expertise to the effect that this decision is unjustified.³



Also, PP is often presented as a safeguard against introducing new technologies, such as nanotechnologies. The stated goal is that they should not be approved until their safety is fully proven. In actual fact, application of PP often ends up targeting various products that have been on the market for decades, with no problems found, even if they are references in their respective industries (see the examples below of

DDT and Bisphenol A).

Finally, application of PP by political authorities has run amok in cases where environmental risk is non-existent. The precautionary approach thus aims, for example, at common consumer products (see Table 1, page 2).

1. See Steffen Hansen and Joel Tickner, "The precautionary principle and false alarms — lessons learned," in *Late lessons from early warnings: science, precaution, innovation*, EEA, No. 1, 2013. The authors present a list of 88 potential cases but decide to eliminate nearly all of them, focusing on just four: swine flu in the United States, saccharine, food irradiation and outbreak of corn leaf blight in the southern United States.

2. See the *Proposition de loi relative à l'application du principe de précaution défini par la Charte de l'environnement aux risques résultant des ondes électromagnétiques* (Bill on application of the precautionary principle outlined in the Environment Charter to the risks resulting from electromagnetic waves), December 12, 2012, available at: <http://www.assemblee-nationale.fr/14/propositions/pion0531.asp>.

3. See the report from the *Académie nationale de médecine*, the *Académie des sciences* and the *Académie des technologies* titled "Réduire l'exposition aux ondes des antennes-relais n'est pas justifié scientifiquement" (Reducing exposure to waves from relay antennas is not scientifically justified), December 15, 2009, available at: <http://www.academie-medicine.fr/detailPublication.cfm?idRub=26&idLigne=1752>.

TABLE 1

Examples of common consumer products targeted by PP

Country	Products targeted	Reason invoked
Norway	Cornflake-type cereals fortified with vitamins	Health risk if consumed in "uncontrollable and unexpected" amounts
Denmark	Fruit juice with added Vitamin C	Future risk for some consumers with Vitamin C sensitivity
France	Energy drinks	Risk of excess caffeine consumption by pregnant women
France	E-cigarette	Lack of certainty over the product's toxicity level ⁴

Source: Marchant and Mossman, 2004, *op. cit.*, p. 16.

Governments therefore intervene once the least doubt is raised, whether or not there is a scientific basis. The list runs from GMOs to mobile telephones and electromagnetic waves, and also includes e-cigarettes and other everyday products.

In response to this PP proliferation, numerous warnings have been issued, indicating that this was raising legal uncertainty for businesses and could harm economic activity.⁵ PP is also viewed as a serious obstacle to technological innovation and scientific progress.⁶

Less common, however, are warnings related to the health and environmental hazards inherent to political application of PP, which disregards the benefits of targeted products, thereby increasing overall risk rather than reducing it. PP may also require companies to turn to less effective substitutes with real economic, health and environmental risks that may prove "worse than the disease."

A PRINCIPLE THAT CAN PROVE FATAL

Giving up on an activity, product or technology in the name of PP means "running the risk of losing the advantages it can provide."⁷

In other words, though applying PP may seek to reduce certain risks, it increases other risks at the same time, or gives rise to new risks, substituting one risk with another one in a "risk-risk trade-off."

These risks that arise from applying PP tend to be all the greater considering that the products covered are references in their markets.

An example that clearly illustrates this precautionary risk is the controversial case of the pesticide DDT (dichlorodiphenyl-trichloroethane). Discovered by Paul Müller, who won the 1948 Nobel Prize in medicine for its development, DDT was regarded as the reference product⁸ in the fight against malaria in the mid-20th century. It enabled this fatal disease to be eradicated fully in the developed countries and helped control it elsewhere. According to the U.S. National Academy of Sciences, the benefits in terms of human lives saved have been considerable: "In little more than two decades, DDT has prevented 500 million human deaths due to malaria that would otherwise have been inevitable."⁹

Despite these benefits, DDT was targeted by public authorities following publication in 1962 of the book *Silent Spring* by Rachel Carson. Accused, among other things, of harming certain birds, DDT came under pressure from environmental groups and was banned in the developed countries in the early 1970s despite the health benefits and the numerous scientific opinions¹⁰ that found it harmless.

Obtaining it became difficult at the international level, and countries dependent on international assistance¹¹ in their fight against malaria were pressured into ending its use.¹² The World Health Organisation (WHO) also gradually shifted away from DDT in its malaria control programs although this was always recognized as one of the least expensive and safest means.

Many examples indicate that use of DDT would lessen the prevalence of malaria and that, in contrast, abandoning it would revive the disease and increase the number of deaths (see Table 2, page 3). To deal with malaria, DDT use was again recommended by the WHO in 2006.

A study dealing specifically with several South American countries in the mid-1990s produced similar results.¹³

4. See Bertrand Dautzenberg, "Réglementons la cigarette électronique sans délai," *Le Monde*, February 7, 2013, available at: http://www.lemonde.fr/sciences/article/2013/02/07/reglementons-la-cigarette-electronique-sans-delai_1828722_1650684.html.

5. See Marchant and Mossman, 2004, *op. cit.* See also, for example, the 2008 *Rapport de la Commission pour la libération de la croissance française* (Attali report), which notes that the PP leads, in French reality, to situations of indecision that are "paralysing for industrialists and for long-term investment over all" and that it "constitutes an obstacle to growth." The report recommends repealing Section 5 of the 2004 Environment Charter.

6. The *Académie des sciences* — which recommended not including it in the French Constitution — and the *Académie de médecine* have also spoken out several times against the misuse of PP.

7. See the *Economic Note*, "Precaution with the Precautionary Principle," Institut économique Molinari, March 2005, available at: <http://www.institutmolinari.org/IMG/pdf/note20051.pdf>.

8. And not only from the standpoint of its low cost but also in terms of its effectiveness over time, its ease of application and its non-toxicity for humans.

9. Cited in Adam Lieberman and Simona Kwon, "Facts versus fears: a review of the greatest unfounded health scares of recent times," American Council on Science and Health, 2004, p. 8.

10. See Lieberman and Kwon, 2004, p. 9, who note that "[i]n the years preceding the DDT ban, the National Academy of Sciences, the American Medical Association, the U.S. Surgeon General, the World Health Organization, and the Food and Agriculture Organizations of the United Nations had been among those who spoke out in support of the continued use of DDT as a disease fighter and crop protectant."

11. See Richard Tren & Roger Bate, *When politics kill: malaria and the DDT story*, Competitive Enterprise Institute, Jan. 2001, pp. 21-25, available at: <http://cei.org/studies-point/when-politics-kills-malaria-and-ddt-story>. The authors provide several examples of western international aid agencies that pushed malarious countries to stop using DDT as a condition for receiving funds.

12. See D. Roberts, S. Manguin and J. Mouchet, "DDT house spraying and re-emerging malaria," *The Lancet*, Vol. 356, July 22, 2000, pp. 330-331. It is stated that, "[s]ince the early 1970s, DDT has been banned in industrialised countries and the interdiction was gradually extended to malarious countries" (p. 330).

13. Donald Roberts et al. "DDT, Global Strategies, and Malaria control crisis in South America," *Emerging Infectious Diseases*, Vol. 3, No. 3, July-September 1997, p. 300.

The costs of "precautionism" involving DDT abandonment are thus far from hypothetical, with millions of human lives lost, but the issue remains a source of debate. While the WHO says malaria may be causing the deaths of nearly one million people per year¹⁷ and the 2000 Stockholm Convention on Persistent Organic Pollutants makes it possible to use DDT to fight malaria, new initiatives aim to eliminate it worldwide.¹⁸

Beyond a doubt, the case of DDT is one of the most dramatic and most visible. But this hardly means that banning other products may not prove just as hazardous to health. That, for example, of Bisphenol A (BPA)¹⁹, used in epoxy resins in varnish form, which has stood out for decades as the optimal solution for covering food containers (jars, cans, etc.). Using it helps insulate and preserve food, protecting consumers from poisoning linked to bacteria such as E. Coli or botulism (another disease that can cause death). Banning it from all food containers in the name of PP — counter to the position taken by most health authorities worldwide — may increase the risk of food insecurity in the absence of substitutes that are as safe and effective.

NEW RISKS THAT ARISE FROM APPLYING PP

Increased market uncertainty

Restricting or prohibiting a product inevitably creates market uncertainty, generating new risks that were previously non-existent.

On the one hand, any new regulation or prohibition requires companies to make adjustments, and this can create unforeseen risks. For example, in France, an arbitrary decision to reduce the power of relay antennas in the name of PP could, on the contrary, "increase, without justification, the exposure of 90% of French people using mobile telephones." Why? Because the antennas' reduction in power will require operators to add more of them to offset the decrease in coverage areas. A mobile phone's transmission power increases each time you go from one area to another, resulting in greater exposure for users.

On the other hand, a prohibition in the name of PP may also push companies into falling back on substitutes with health and environmental risks that are at least as great. This uncertainty is made higher due to the targeted product being broadly used in its industry.

Country	DDT use / changes in malaria cases
India	Decline by 100 million in the annual number of cases of malaria, down to 100,000 cases in 1965, thanks to DDT. After its use was halted, the number climbed back to six million in 1976 ¹⁴
Indonesia	After DDT use was halted in the early 1960s, the number of cases went from fewer than 6,000 cases in 1963 to 346,000 cases in 1973
Zanzibar	Increase in the malaria rate from 23.2% of the population in 1989 to more than 60% in 1994 after the DDT treatment program was halted
Sri Lanka	Reduction due to DDT in cases of malaria from 2.8 million in 1948 to 17 in 1963. After DDT use was halted in 1964, the number climbed back to 2.5 million in 1969 ¹⁵
KwaZulu-Natal, South Africa	After DDT use was abandoned in 1996, cases of malaria rose from 600 per month in 1996 to more than 2,000 per month in 1999. A reduction was noted in the number of cases after DDT was reintroduced in March 2000, in some places only, from 42,000 in 2000 to 2,100 in 2002 ¹⁶

For example, in the fight against global warming, a European directive in 2006 prohibited the use of R134a gas,²⁰ widely used in the air conditioning systems of cars, as of January 1st, 2013. This decision led carmakers to turn to HFO 123yf gas. Unlike its predecessor, this substitute is a gas that becomes highly toxic, and possibly even fatal, if it catches fire. In case of an accident, it could endanger the lives of passengers and rescue personnel.²¹

The case of BPA, mentioned above, is another example. Applying PP in that instance could very well create new risks for consumers, involving substitutes that are hurriedly found under pressure from public authorities.

The political promotion of new technologies

Some products end up being pushed in the name of PP. However, not only is their use far from risk-free, but it is proving to be a source of waste and of new hazards for the public.

14. Cohen et al. "Malaria resurgence: a systematic review and assessment of its causes," *Malaria Journal*, 2012, p. 11.

15. Lieberman and Kwon, *op. cit.*, p. 9.

16. R. Maharaj et al., "Impact of DDT re-introduction on malaria transmission in KwaZulu-Natal," *South African Medical Journal*, Vol. 95, No. 1, November 2005, pp. 871-872.

17. In the decade from 2000 to 2010, the average number of deaths caused by malaria was estimated at more than 756,000 per year, with the highest estimate suggesting nearly 960,000 deaths. See the WHO report, *World Malaria Report 2012*, Appendix 6b, "Estimated cases and deaths, by region, 2000-2010," available at: http://www.who.int/malaria/publications/world_malaria_report_2012/en/.

18. See Richard Tren, Richard Kamwi and Amir Attaran, "The UN is premature in trying to ban DDT for malaria control," *British Medical Journal*, October 10, 2012. The United Nations Environment Program (UNEP) has been promoting an end to the use of DDT starting in 2017, with full elimination in 2020, while "encouraging India, the only country that makes DDT, to stop producing it."

19. See Valentin Petkantchin, "Les risques du précautionnisme : le cas de l'interdiction du bisphénol A" (The risks of precautionism: the prohibition of Bisphenol A), Institut économique Molinari, October 2012, available at: http://www.institutmolinari.org/les-risques-du-precautionnisme-le_1423.html.

20. See the European Commission declaration on this subject, dated December 19, 2012, "State of Play of the EU Mobile Air-Conditioning directive (2006/40/EC)," available at: http://ec.europa.eu/enterprise/sectors/automotive/files/environment/mac/note-macs-december-2012_en.pdf.

21. See, among others, Christiaan Hetzner, "Coolant safety row puts the heat on Europe's carmakers," *Reuters*, December 12, 2012, available at:

<http://uk.reuters.com/article/2012/12/12/uk-europe-cars-refrigerant-idUKBRE8BB0HE20121212>.

22. Beyond fiscal support, laws include minimum thresholds for biofuel content in the total volume of fuel consumed. On this subject, see Marian Eabrasu, "Les aides à la production de biocarburants" (Assistance for biofuel production), Institut économique Molinari, February 8, 2013, available at: http://www.institutmolinari.org/les-aides-a-la-production-des_1476.html.

Biofuels provide a perfect illustration of this. Because they are supposed to generate lower greenhouse gas emissions than conventional petroleum products, their development has been encouraged by public authorities in recent decades through tax and regulatory means²² in the name of PP and the fight against global warming.

What has been the result of this political "promotion"?

From an economic standpoint, this policy is causing considerable market distortion. Companies have been pushed into "malinvesting" in refineries and other equipment and wasting scarce resources (land, energy, water, labour, pesticides, fertilisers, etc.).

Also, by diverting a portion of farm production from its traditional use of feeding the population, biofuel policy contributed to an artificial spike in agricultural prices and increased the risk of a food crisis. Thus, the IMF's index of food commodities prices increased 130% between 2002 and 2008 and it is estimated that biofuel policy was responsible for up to 75% of this increase.²³

But that's not all. The belief that "the CO₂ emitted during combustion of the biofuel does not enter into the balance because it was absorbed from the atmosphere by the growing crop"²⁴ does not stand up to scrutiny.

It is obvious that new crops for biofuel production inevitably replace either existing crops (which would absorb CO₂ emissions from the combustion of petroleum products) or, worse in terms of CO₂ emissions, uncleared land that would require, for example, deforestation with considerable quantities of CO₂ released into the atmosphere.

In attempting to take account of these substitution effects in land use, a 2008 study estimated that corn-based ethanol production, in reality, "nearly doubles greenhouse gas emissions over 30 years and increases greenhouse gases for 167 years."²⁵ The results of another study are similar and show that "the net effect of biofuel production via clearing of carbon rich habitats is to increase CO₂ emissions for decades or centuries relative to the emissions caused by fossil fuel use."²⁶

To sum up, biofuels have indeed been promoted in the name of PP, even though they are likely to generate substantial adverse effects. These include, as indicated in an official report, "negative impacts on biodiversity (e.g., replacement of natural forest with biofuel crops, spread of monocultures), water availability under scarcity, water quality, soil degradation, negative carbon and energy balances, potential conflict with food production and food security, as well as worsening GHG emission levels because of indirect land-use change."²⁷

CONCLUSION

Rather than favouring a risk-free society, "precautionism" as embodied by PP is a source of recklessness, waste and new hazards for humans and for the environment.

The *Académie des sciences* spoke out in 2003 against its inclusion in the French Constitution, noting that "it could lead to adverse effects, likely to have disastrous consequences on the future progress of our well-being, our health and our environment."²⁸

The record of these adverse effects is such that they must no longer be disregarded. To reduce these effects and to avoid them in the future, it is essential to de-sanctify the precautionary principle and to maintain a critical eye each time political decisions are put forth in its name.

23. See, among others, Donald Mitchell, "A Note on rising food prices," World Bank, July 2008, available at: http://econ.worldbank.org/external/default/main?pagePK=64165259&piPK=64165421&theSitePK=469072&menuPK=64166093&entityID=000020439_20080728103002.

24. See A. Armstrong *et al.*, "Energy and greenhouse gas balance of biofuels for Europe — an update," CONCAWE, Brussels, 2002, p. IV, available at: http://jack.ecosse.org/research/sustainable/various/CONCAWE-26601_tcm24-124161.pdf.

25. See Timothy Searchinger *et al.* "Use of croplands for biofuels increases greenhouse gases through emissions from land-use change," *Science*, Vol. 319, February 29, 2008, p. 1238.

26. See Joseph Fargione *et al.*, "Land clearing and the biofuel carbon debt," *Science*, Vol. 319, February 29, 2008, p. 1237.

27. Aziz Elbehri *et al.*, "Biofuels and the sustainability challenge: a global assessment of sustainability issues, trends and policies for biofuels and related feedstocks," United Nations Food and Agriculture Organization, Rome, 2013, pp. 5-6, available at: <http://www.fao.org/docrep/017/13126e/13126e.pdf>.

28. See the text adopted by the *Académie des sciences*, "Charte de l'environnement: conclusions et recommandations," March 18, 2003, p. 2, available at: <http://www.academie-sciences.fr/activite/rapport/avis180303a.pdf>.



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