



# Justifying the Precautionary Principle as a political principle

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**ABSTRACT:** Our aim is to defend the Precautionary Principle (PP) against the main theoretical and practical criticisms that it has raised by proposing a novel conception and a specific formulation of the principle. We first address the theoretical concerns against the idea of there being a principle of precaution by arguing for a distinctively political conception of the PP as opposed to a moral one. Our claim is that the rationale of the PP is grounded in the fact that contemporary societies wish to avoid morally unacceptable risks while at the same time pursuing other goals, aspirations and values. Following this political conception of the PP, we propose a specific formulation in terms of an argumentation scheme—the Argumentation Scheme for Appealing to Precaution—which is meant to solve, in turn, the main practical concerns that the PP has raised. We explain the advantages of our proposal by analysing appeals to precaution in the cases of (1) the European restrictions on the free movement of persons during the COVID-19 pandemic and (2) the discharge of nuclear wastes into the Irish Sea.

**KEY WORDS:** Precautionary principle · Proactionary principle · Precautionary framework · Political minimalism · Public decision-making · Argumentation scheme

## 1. INTRODUCTION

Since the second half of the past century, countless directives have been issued in the name of an alleged Precautionary Principle (PP) regulating research and political decisions. The hallmark of the PP is the consideration of an ‘extraordinary risk’ in conditions of ‘uncertainty’.<sup>1</sup> This hallmark sets the PP apart from other principles of risk assessment and risk management. Specifically, the PP is to be distinguished from the ‘Prevention Principle’, which conditions the taking of measures to the likelihood of the damage and evaluation of its scope, and it is based on estimates of costs and benefits. In this regard, the PP would imply a greater demand than the Prevention Principle since it may mandate taking measures in situations in which the threat is only conjectural (Sheng et al. 2015).

Despite being widely mentioned in national and international regulations as well as in social and academic debates, appealing to this principle still poses serious practical difficulties and raises deep theoretical concerns. From a practical point of view, critics have pointed out that current formulations of the PP are too vague and ambiguous for guiding decision-

<sup>1</sup>There is overall agreement on what makes a risk uncertain in this sense: for example, the European Commission (2017, p. 5) describes it as a matter of lack of scientific evidence, existence of scientific disagreement or impossibility of establishing specific cause–effect relationships. Yet there is not so much consensus on what makes a risk extraordinary. Most of the time, though, the term is used to stress the severity and irreversibility of the possible harm. In this paper, we provide a different account of what makes a risk extraordinary, to effectively understand the PP as a principle for decision-making proper.

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making (Turner & Hartzell 2004), whereas others have argued that certain appeals to the PP have resulted in serious and unjust harm (Goldstein 2007). In turn, from a theoretical perspective, critics have questioned the very notion of a ‘principle of precaution’ on the grounds that being cautious in conditions of uncertainty does not constitute an essential feature of good decision-making (More 2013, Holbrook & Briggie 2014).

This paper aims to uphold the PP from both types of criticisms. In the first sections, we defend the existence of a ‘principle’ of precaution by arguing for a political conception of such principle as opposed to a moral one.<sup>2</sup> Our claim is that understood as a political principle, the PP is indeed a principle, in the sense of a norm that settles a political obligation when its conditions are met. To show this, we start by agreeing with critics that being cautious, even when confronted with the possibility of severe and irreversible harm, is not a necessary feature of good decision-making (Section 3). Yet following a moralist conception of the PP, we argue that there is a kind of extraordinary risk that makes precaution mandatory (Section 4). The moralist conception of the PP characterizes this extraordinariness as a matter of this risk being imposed on others without their consent. We argue that thinking of the PP as a principle requires thinking of it as a political — and not a moral — norm whose rationale is grounded in the fact that contemporary societies wish to avoid morally unacceptable risks (understood, specifically, as ‘unconsented’ risks) while pursuing other goals, aspirations and values at the same time (Section 5). Following this political conception of the PP, in Section 6, we explain the advantages of formulating the PP by means of an Argumentation Scheme for Appealing to Precaution (ASAP), and we propose a specific ASAP\*

<sup>2</sup>Epistemic accounts of the PP have focused on showing that it is epistemically sound to endorse precaution in certain contexts. Unfortunately, a proper analysis of this literature exceeds the scope of this paper. Yet we take it to be adequate to put aside this question for 2 convergent reasons: on the one hand, since the PP is meant to be a principle for policymaking, it constitutes a practical norm (whether its justification is practical or epistemic in turn). Accordingly, it makes sense to focus on whether it is a merely instrumental norm, a moral norm, or a political norm; for one thing, is the nature of the PP and another, its justification. On the other hand, our thesis is that if we take the PP to be a political principle, then it holds as a principle proper. This does not mean that the PP is to be justified on political grounds but rather that as a political principle, it can be taken to be a principle indeed, in the sense of a norm that stands unless it clashes with another norm of the same domain.

that is meant to overcome some of the main practical concerns that the PP has raised (Section 6). Finally, in Section 7, we show the potential of this proposal by analysing 2 appeals to the PP: one on restricting the free movement of persons during the COVID-19 pandemic and another against the discharge of nuclear wastes into the Irish Sea.

## 2. PROBLEMS WITH THE PP

The first international text that explicitly mentions the PP was The Vienna Convention for the Protection of the Ozone Layer (22 March 1985; United Nations Environment Program 1987). The goal of this multi-lateral agreement was to establish guidelines to prevent the depletion of the ozone layer and subsequent damages to human health and the environment. The reason given for adopting those precautionary measures was that despite not being certain, the damage would be irreversible and far too serious not to be considered.

After that explicit appeal to a PP, countless others have followed. This proliferation has resulted in a variety of alternative formulas aimed at expressing the principle that is supposed to sanction such appeals.<sup>3</sup> Unfortunately, the different formulations that have been enunciated are far from articulating the same notion of good precautionary decision-making. In fact, it is common to distinguish 3 types of formulations of the PP that seem to shape very different intuitions on what good precautionary decision-making is (Cooney 2004, Luján & Todt 2007, 2012). On the one hand, there are strict or strong formulations, such as the ‘Wingspread Consensus Statement on the Precautionary Principle’ (Wingspread Conference participants 1998), according to which the mere possibility of severe damage would be sufficient reason to take measures — normally, prohibitions — regardless of their cost or the likeliness of the damage in question. There are also weak formulations, such as the ‘Bergen Ministerial Declaration on Sustainable Development in the ECE Region’ (United Nations 1990), according to which precautionary measures are neither required nor justified but are simply not impeded in case of uncertain risk. Finally, moderate formulations, which are the most common in legal texts and international regulations — such as those from UNESCO and the European Commission — establish that the

<sup>3</sup>See, for instance, Peel (2005) for a thorough listing of the different formulations of the PP to that date.

possibility of severe and irreversible damage, however uncertain, is a reason for the adoption of precautionary measures. This type of formulation is moderate because the risk of harm does not imply the need to take precautionary measures in an unrestricted manner (as in the case of strong formulations), but it is conceived as a reason that justifies taking certain measures.

The strength or weakness of formulations has sometimes been understood as a matter of determining who bears the burden of proof in case of conflict. After all, a formulation may require either that those who demand precautionary measures show that the proposal is dangerous or that those who make the proposal show that it is not. However, formulations of the PP are multi-dimensional and so is their strength or weakness: current formulations not only determine who bears the burden of proof, but also what type of evidence is required, how serious or extraordinary the possible harm must be to trigger precautionary measures or how decisive and forceful such measures shall be (Sandin 1999, Hughes 2006). Accordingly, countless alternative formulations of the PP would be possible, which, in turn, would represent very different conceptions of what is good precautionary decision-making.

Since many public decisions are currently based on appeals to the PP, this plurality of possible formulations of the PP may create legal insecurity and raise suspicions of arbitrariness on those decisions allegedly guided by one formulation instead of another—since different formulations may sanction very different decisions. For this reason, there have been important attempts at refining and shaping the PP into a workable and universally agreed formulation. These attempts have sprung from, and given rise to, thorough academic and political debates, such as those around the ‘Communication from the Commission on the Precautionary Principle’ (Commission of the European Communities 2000). However, these initiatives have barely achieved their purpose of making the PP more actionable and unambiguous, not even in cases where policymakers explicitly endorsed a specific formulation.<sup>4</sup> In fact, to date, no agreement on a specific formulation has been reached.

For critics such as Peterson (2006, 2017), the difficulty of finding a problem-free formulation is due to the incoherence of the PP itself, which would explain why so often one and the same apparently sound formulation of the PP may sanction decisions that run in

opposite directions. Other critics have considered that the problem is that the PP is inconsistent because taking measures against a technology, product or activity may pose a threat to our future well-being and security; so that, if such measures are supposed to be taken in the name of the PP, then the PP would have to be applied against itself (Manson 1999, Mandel & Gathii 2006, Sunstein 2008).

Certainly, problems with the applications of the PP abound. In some cases, appeals to precaution have resulted in costly overregulation (Durodié 2003, Nilsson 2004). For some critics, this is because the PP puts too much focus on mere possibilities, bringing us to distraction with ‘purely hypothetical threats’ (Whelan 2000). In turn, the PP has also enabled the practice of manufacturing uncertainty, which, as a matter of fact, has hampered action against important threats to the environment (Zehr 2000) and human health (Michaels 2008). Finally, there are abusive uses of the PP in which precaution has been appealed to in order to get rid of competitors who lack the necessary resources to face the expensive procedures that might show the harmlessness of their proposals (Levidow & Carr 2000, Levidow & Marris 2001, Miller & Conko 2001).

In view of the apparent impossibility of finding a workable and problem-free formulation of the PP, some authors have proposed thinking of precaution not as a principle, but as a cluster of related principles and norms (Powell 2010, Rodríguez-Alcázar 2010), as some kind of meta-principle (Steel 2014, Hansson 2018) or as a framework or approach (Hartzell-Nichols 2013, 2014, Holbrook & Briggles 2014, Wolff 2014). In turn, most radical critics of the PP have recommended getting rid of precaution as a principle altogether on the grounds that, in general, we have as many reasons to guide our decisions by precaution as by audacity (Harris & Holm 2002, Posner 2004, Sunstein 2005, 2008, Sandin 2007, Burnett 2009, Fuller 2012a, Fuller & Lipinska 2014). On this view, the uncertainty of the threat—which is the hallmark of the PP, in contrast with other ‘normal’ risk management tools—would discourage considering the PP as a real principle because precaution in conditions of uncertainty would not be necessary for good decision-making.

### 3. IS PRECAUTION ESSENTIAL FOR GOOD DECISION-MAKING?

Certainly, it is difficult to assess what we lose when we decide not to implement a specific new technol-

<sup>4</sup>See, for example, Todt & Luján (2011) regarding the REACH directive on chemicals.

ogy. Yet the living conditions in a possible world where a certain technology is lacking may be much worse than those in a different possible world where this technology was implemented. Thus, even though it is difficult to miss what we never had, such possible harm must also be considered. From this perspective, the precautionary attitude may be questioned on an ethical basis, since obsession with security may pose a threat to the welfare of other communities and future generations. For example, limiting the use of genetically modified organisms or nuclear energy could mean that in the future, humans' needs for food or energy might not be met, and the prohibition of pesticides in developing countries may increase the risk of spreading diseases such as malaria (Attaran et al. 2000, Gray & Hammitt 2000). Our desire for security is not always compatible with the needs of all groups and, depending on the circumstances, it can amount to a kind of self-indulgence that only wealthy societies can afford.

Regarding the transhumanist debate, Fuller (2012a) argued that being cautious is not the only reasonable attitude when facing novelties. In principle, it may also be reasonable to adopt a proactive attitude that promotes innovations while responsibly responding to the challenges and problems that these may bring about. Following this line of thought, Fuller & Lipinska (2014) proposed confronting the hurried spread of the PP with a 'Proactionary Imperative', which endorses More's (2004, 2013) 'Proactionary Principle', not as a mere guide for decision-making, but as a moral norm. For proactionaries such as Fuller and Lipinska, we must promote novelties and learn how to deal with everything they are able to bring about, whether (apparently, at first sight) good or bad, and this is not just a matter of good decision-making, but a moral imperative based on the idea that humanity only thrives through innovation.

The fact that, as proactionaries point out, innovating is humans' way of inhabiting this world — with all its problems of social injustice, global warming, etc. — does not really seem to support that proaction is a moral imperative: we humans innovate, it is just what we do; but why should we do it? However, the proactionaries' perspective poses one of the most radical criticisms against the PP: namely, the idea that precaution, even when confronted with the possibility of severe and irreversible damage, is not essential for good decision-making.

Proactionaries' perspective stresses that in conditions of uncertainty — which are those that are supposed to trigger the PP — there are as many reasons to be pessimistic as to be optimistic about what haz-

ardous technologies and practices may finally bring about, and even our mistakes can teach us to do better in the future. According to these critics of the PP, precautionaries would be blind to the potentials of risk because, ultimately, they endorse a conservative attitude that prioritizes the status quo; but the question is: is our situation so hardly improvable that it only makes sense to try to improve it without taking any risks?

For radical critics of the PP, precautionary decision-making would be designed to unleash our irrational fear of novelties, making room for our cognitive prejudices when evaluating risks which, in conjunction with current societies' risk aversion (Beck 1986), may result in an irrational and even immoral obstacle to innovations. In contrast with the Prevention Principle, the PP would unjustifiably favour risk aversion policies and irrational decisions as regards cost-benefit analysis, inducing us to ignore the costs of precautionary measures themselves and of missed opportunities (Keeney & von Winterfeldt 2001, Harris & Holm 2002, Sunstein 2005, 2008, Sandin 2007, Burnett 2009). Sunstein (2005), for one, proposed that we get rid of the PP and limit ourselves to ordinary risk-management policies that, unlike the PP, are based on probability estimates and allow for inter-subjectively trackable analyses in terms of costs and benefits.<sup>5</sup>

Although authors such as Gardiner (2006) or Aldred (2012, 2013) have proposed formulations of the PP that take into account the possible losses of not taking risks — in a more balanced conception of good precautionary policymaking than what some critics of the PP seem to envisage — in our view, the above type of criticism shows that there is a problem with arguments for the PP grounded in the idea that precaution is an essential feature of good decision-making. Certainly, there is a notion of precaution which is indeed essential for good decision-making; after all, deciding is displaying the means to get what we want, which necessarily includes not getting what we don't want, and displaying the means to avoid what we don't want is, in a way, adopting precautionary measures. However, this notion of precaution is too lean to characterize the PP. If the PP were just an appeal to such sort of precautionary attitude, it would not make sense to demand precaution or to wonder whether we should be cautious or not because precaution would be part of any decision-

<sup>5</sup>In a more moderate vein, Sunstein (2021) has recently admitted a role for the PP.

making process, whether good or bad. The type of precaution that the PP sanctions is a feature of decision-making that prioritizes the avoidance of what we don't want over the obtention of what we want — safety over gains. That this is the notion of precaution underlying the PP explains why there is a real debate between precautionaries and proactionaries. According to Fuller (2012b, p. 1), 'precautionary policymakers set their regulatory focus on the prevention of worst outcomes, whereas proactionary policymakers seek the promotion of the best available opportunities'.

Since prioritizing safety over gains is not the only rational way of facing risks, we cannot say that precaution is essential for good decision-making. The most radical criticism against the PP does not focus on the difficulties of finding a workable formulation of the PP, but on the very possibility of embedding precaution as a principle.<sup>6</sup> After all, a principle is meant to lay down an obligation that stands unless it clashes with another obligation of the same type, but it seems difficult to articulate an overall obligation to prioritize safety over gains. In fact, people sometimes have good reasons, even moral ones, to prioritize gains, no matter how serious the risk could be. This is, for example, what heroes do.

However, the fact that precaution is not an essential feature of good decision-making in general does not entail that we cannot establish a PP for decision-making in certain contexts. The PP, as usually understood, does not prioritize safety over gains in all situations in which we face uncertain risks, but only when the risk is extraordinary in some sense. So, the question would be: is there any kind of risk that could make precaution mandatory, so as to turn the PP into a principle proper — in the sense of a norm that establishes an obligation that stands unless it clashes with another obligation of the same type?

#### 4. JUSTIFYING THE PRINCIPLE OF PRECAUTION

In the last years, growing literature on the PP suggests that there is indeed such a kind of risk that makes precaution mandatory. Authors such as Gardiner (2006), Sandin (2007), Aven (2010), Munthe (2011) Petrenko & McArthur (2011) and Szentkirályi

(2019) underline one fundamental aspect of the PP which is salient in the well-known version of the PP that UNESCO endorses: 'When human activities may lead to *morally unacceptable* harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm' (World Committee on the Ethics of Scientific Knowledge and Technology 2005, p. 14; our italics). Under this view, the PP would urge precautionary measures when we risk 'morally unacceptable' harm.

Yet what makes harm 'morally unacceptable'? According to Petrenko & McArthur (2011), the decisive question is whether the harm might fall on others who have not freely and informedly consented to take the risk associated with the hazardous practice or technology. As they point out, playing Russian roulette may be fine if, given the circumstances, one thinks it's worth the risk; but playing Russian roulette on the head of another person that has not consented to it is simply unacceptable from a moral point of view, even if the probability of killing that person were one in many millions or just uncertain, and no matter how much you, the other person involved, or someone else could get from doing it.<sup>7</sup>

As a moral principle, the PP would be justified 'on the general obligation not to harm others (without informed and explicit consent), where the requisite magnitude of harm is sufficient to deprive others of their moral entitlements' (Petrenko & McArthur 2011, p. 358). That is, when the possible harm is of enough magnitude, we are justified in depriving others of, for example, their freedom for conducting research or pursuing profit. So understood, 'the precautionary principle is justified not because it leads to justified beliefs or, strictly speaking, to rational choices but because it leads to morally right actions' (Petrenko & McArthur 2011, p. 351).

This moral perspective highlights the social dimension of the PP: it comes into play, not exactly as a guide to deal with risks, but as a guide to allocate their distribution among people. So understood, the PP is not only a principle for decision-making but a categorical imperative: taking precautionary measures is mandatory whenever the possible damage is morally unacceptable. From this perspective, imple-

<sup>6</sup>Regarding the economic costs and welfare losses of delaying technological innovation, see, for instance, Hoppe (2002), Bostrom (2003), Castro & McLaughlin (2019).

<sup>7</sup>If the only way to save someone else's life were to play Russian roulette on a third person's head, we would face a moral dilemma proper; that is, we would be in a situation in which 2 moral principles (i.e. not to kill and not to let someone be killed if one can avoid it) pose incompatible obligations on us. But that moral principles can conflate does not mean that they are not principles.

menting the PP would not require assessments in terms of costs and benefits because playing with others' well-being without their informed consent is always morally unacceptable, no matter how much others/all could gain by doing it. Thus, according to Petrenko & McArthur (2011), it is a mistake to think of the PP as a consequentialist principle justified on utilitarian grounds. Instead, they think that because the PP deals with the matter of imposing undeserved risks on others 'it can be considered from the deontological and contract-theoretic positions' (Petrenko & McArthur 2011, p. 351).<sup>8</sup> From this moralist perspective, the only thing that could stand in the way of taking measures against any non-consented allocation of risk of severe damage is that taking these measures happens to be incompatible with other moral obligations.

So, can we finally say that the PP is a moral principle for decision-making? Despite being informed by a moral obligation (namely, the obligation of not imposing risks on others without their free and informed consent), we think that the PP should not be conceived as a moral principle. The PP emerged as a principle for public decision-making. Precautionary decisions made in the public sphere are justified not only by pointing out that the possible harm is morally unacceptable, but also in virtue of their adequacy as regards the rest of the values, goals and needs that society endorses: not imposing risks on others without their consent is a moral obligation, but not a principle for public decision-making. To illustrate this point, consider, for example, public policies regarding motor vehicles. The loss of innocent human lives is the ultimate morally unacceptable harm that, from a moral point of view, should never be put at risk. Yet motor vehicles put thousands of innocent lives at risk every day without their consent, mainly due to crashes and pollution.<sup>9</sup> We accept such morally unacceptable

risk because the limitation of traffic to the point of making it completely safe would be extremely costly in many respects. That is: in real life, precautionary measures do not straightforwardly respond to the moral obligation that one should not play with others' well-being without their voluntary and informed consent. On the contrary, such precautionary moral obligation is made compatible with the rest of our values, goals and needs in a balance of costs and benefits broadly understood.

This may be the reason why some of those who think that precaution is a moral obligation have argued against the idea of a principle of precaution in favour of a precautionary approach instead. For example, Munthe (2011) defended the need for a morality of precaution and a theory about the morality of imposing risks, but he proposed abandoning the idea of the PP and developing a precautionary framework able to determine a proper degree of precaution. Likewise, Hartzell-Nichols (2013, p. 317–318) holds that what we need is precautionary decision-making frameworks and precautionary policies instead of appealing to 'the' PP:

... 'the' precautionary principle is not and cannot be a universal principle. We should therefore abandon talk of 'the' precautionary principle in favour of rigorous accounts of precautionary principles and more general talk of precaution or precautionary approaches[...] Precautionary decision-making frameworks aim to accomplish just this by helping decisionmakers understand when a precautionary principle applies and what it requires of us. Rethinking 'the' precautionary principle in this way will allow for precaution to have a more meaningful and powerful role in both public policy and our ability to understand our precautionary obligations...

In a similar vein, Szentkirályi (2019) proposed settling a 'standard of due care' to grant the protection of people in public decision-making. In principle, such a standard is something that each society must establish, but the idea is that we must pay unconditional respect to others' well-being and that uncertainty provides no moral excuses.

Certainly, precautionary decision-making urges measures beyond what a mere cost–benefit analysis recommends (Burgos & Defeo 2004). For this reason, some authors think that in the end, the PP must be grounded in morality instead of purely instrumental rationality. However, while the moral obligation of not playing Russian roulette on someone else's head admits no trade-offs, public decision-making about the development of potentially dangerous activities is all about trade-offs between the precautionary moral obligation and the rest of our values, goals and needs: public decision-making does not always hon-

<sup>8</sup>Petrenko & McArthur (2011) think that only a deontological perspective can provide this moralist conception of the PP with the status of a principle. Certainly, act-consequentialism acknowledges only one principle, which is to act to promote the best consequences, and nothing warrants that, other things being equal, not imposing unconsented risk on others will always bring about the best consequences. Yet from a rule-consequentialist perspective, it might be argued that not imposing unconsented risks on others is morally compulsory because abiding by this norm has better consequences than not doing so (Kahn 2012).

<sup>9</sup>It could be argued that every participant in traffic consents implicitly, but green activists radically opposed to polluting vehicles and future generations that will inherit traffic's damage to the environment may also be victims.

our the moral principle of not putting innocents at risk without their informed and free consent.

Petrenko and McArthur are somehow aware of this difficulty: 'the next interesting question — albeit one beyond the scope of this paper — is determining how, in a situation characterized by uncertainty and conflict of moral obligations, the magnitude and nature of harm to others can provide guidance in the formulation of a morally responsible policy' (Petrenko & McArthur 2011, p. 357).

Contrary to what Petrenko and McArthur suggest at this point, we think that the moral obligation of not imposing unconsented risks stays no matter the severity of the possible damage. For example, it is morally unacceptable to play Russian roulette on someone else's head, even if the gun is only a toy that splashes water. For Petrenko and McArthur, not-so-severe harm, a high degree of uncertainty or a conflict of moral obligations could justify not honouring the precautionary moral obligation of not putting others at risk without their informed consent. However, the case of road traffic shows that this explanation of the way we balance the precautionary moral obligation against other considerations is problematic. For, on the one hand, there is little uncertainty about the severe risk that we impose on innocent people by allowing road traffic. On the other hand, the question does not really pose a conflict of moral obligations, but a conflict between a moral obligation and other goals and values that are not moral *per se*—such as having faster and cheaper transport. Thus, because public decision-making frequently balances the moral obligation of not imposing unconsented risks with other goals, needs and values which are not strictly moral, thinking of the PP as a moral principle would amount to thinking of precautionary policymaking, as usually implemented, as being immoral in the last resort: after all, moral obligations do not allow for non-moral concessions. Alternatively, we may say that thinking of the PP as a moral obligation would imply thinking of precautionary public decision-making, as usually practiced, as being only informed — but not determined — by such imperative.

Instead of endorsing this conclusion, we think that while not exposing others to unconsented risks is a moral obligation — no matter how severe the possible damage is — the PP is not a moral principle. Does this mean that, in the end, the PP is not mandatory and, therefore, not a principle at all? In our view, this is a false dilemma based on the assumption that the realm of practical reason consists of either instrumental normativity, which is purely hypothetical, or

moral normativity, which is categorical. We would now like to point out that there is another specific field of practical reason — namely, politics — and that because the PP is a sound, distinctively political principle, it establishes a requirement for public decision-making that stands unless it clashes with other political requirements.

## 5. THE PP AS A POLITICAL PRINCIPLE

Good public decision-making is all about making decisions that best meet the goals, needs and values of a political community—which may, of course, be in conflict. Among such values, the moral values that a community endorses must, of course, be considered. The existence of socially shared moral values and the claim that these provide guidance for political decisions have often blurred the distinction between ethics and politics (Rodríguez-Alcázar 2017). But the difference between ethics and politics can be roughly characterized by observing that the realm of ethics appears when we deal with the question 'What should *I* do regarding others' ends?', while the realm of politics appears when we deal with the question 'What shall we do regarding our ends as a community?' In principle, both questions are compatible, but they are relatively autonomous and, therefore, they may have different answers.

There has been a tendency to reduce, or at least subordinate, the latter question to the former and to demand that the answer to both questions be the same. Kant famously stated: 'All politics must bend its knee before the right' (i.e. the morally right; Kant 1970, p. 124). This claim, however, is the epitome of what Bernard Williams (2005) called 'political moralism'. As Williams pointed out, political moralism faces several problems, including the existence of a diversity of moral codes and values in each society. As a result of this plurality, morality, far from being the solution to political disagreement, is rather one of its main sources (Galston 2010, Larmore 2013). The hope of resolving any political conflict by appealing to moral values inevitably leads to the question: 'whose moral values?'

In contrast to political moralists, political realists such as Hobbes and Williams defend the existence of politics as a normative space of its own, autonomous from morality: political practice would not pursue the morally good but would try to intrinsically satisfy political demands. For Williams (2005, p. 3) the political requirement *par excellence* is 'the securing of

order, protection, safety, trust, and the conditions for cooperation’.

Rodríguez-Alcázar (2017) observed that although security seems a reasonable goal for political communities, pretending that this is the ultimate political aim of any community at any time is as unjustified as assigning the same role to any of the moral goals (freedom, welfare, virtue...) that political moralists have considered essential to politics. There is an alternative to both political moralism and political realism called ‘political minimalism’ (Rodríguez-Alcázar 2017, Rodríguez-Alcázar et al. 2021). This proposal is minimalist in the sense that it does not intend to impose a fixed purpose on political practice, but, on the contrary, it assumes that each political community has, as a matter of fact, its own goals, aims and values at different stages of its history. It is also minimalist because it is not intended to provide a criterion of political adequacy in terms of any substantial goal but merely as a matter of providing good answers to the question, ‘What shall we do, given our ends (goals, aims and values) and the means at our disposal to achieve them?’

For this minimalistic conception of the political, public decision-making is the gist of politics, and the PP can be straightforwardly understood as a political principle: its role is, precisely, to guide public decision-making in cases of uncertain but morally unacceptable risk. Those who think of the PP as a moral principle for public decision-making would assume a moralist perspective according to which the moral obligation to protect the possible victims of an uncertain but morally unacceptable risk must prevail unless doing so clashes with other moral obligations.<sup>10</sup> Contrastingly, from a political minimalist perspective, the moral unacceptability of certain harm — which, as pointed out before, does not depend on its severity but only on whether it is freely consented — is to be balanced against the rest of the goals, needs and values of each political community. From this perspective, it is because contemporary societies endorse the protection against morally unacceptable harm as a moral value that guiding public decision-making so as to honour the PP is politically mandatory: that what is politically rational to do is that for which we have political reasons, i.e. reasons showing that our answer to ‘What shall we do, given our ends

and the means at our disposal?’ is adequate.

Accordingly, if the PP is to be considered mandatory for public decision-making, it cannot be a moral principle but a political one: its overall content is not something along the lines of ‘you shall not put others at risk without their informed and free consent when the possible harm is severe enough’ (which holds on moral grounds), but something along the lines of ‘precautionary measures shall be taken in order to warrant that the moral obligation of not putting others at risk without their consent is made compatible with the rest of our goals, values and needs’ (which holds on political grounds).

As a matter of fact, the idea that the PP is a political principle underlies much of the work on the topic in recent years. However, in lacking an adequate account of the distinction between ethics and politics, a political conception of the PP has not been adequately articulated so far.<sup>11</sup>

Importantly, to say that the PP is a political principle is not simply to say that it is a principle used in politics or policymaking. After all, principles such as non-contradiction or relevance are also used in politics and policymaking, and they are not political but logical and pragmatic, respectively. The reason why the PP is a political principle is that it is meant to tell legitimate from illegitimate policymaking (i.e. right from wrong from a political point of view), much in the same way in which the principle of relevance is a pragmatic principle because it is meant to tell making sense from not making sense (i.e. right from wrong from a pragmatic point of view). Since the aim of the PP is to facilitate adequate political decisions, it can conflict with other political principles. For example, the question of whether to honour the PP at the expense of economic welfare evinces a conflict of political principles. Contrastingly, moral principles and the PP are orthogonal: as the case of traffic road shows, not honouring the moral principle of preserving innocent lives, even if morally unacceptable, may result in legitimate policymaking as long as the PP and other political principles are honoured.

On the other hand, political minimalism is not unhelpfully relativistic because it provides an objective criterion to tell good from bad politics. Political minimalism, though, holds that a good political decision may become a bad one if the context changes, and so it is compatible with a fruitful variant of rela-

<sup>10</sup>Importantly, our discrepancy with the moralist is not necessarily evident as regards decisions made in the name of the PP, but rather as regards the conception of what makes the PP a principle proper.

<sup>11</sup>At times, allegedly moralist defences of the PP are, in fact, defences on political grounds. For example, we think this is the case with Hansson (2003) and Lenman (2008).



tivism. On this view, politics would be a kind of prudential reasoning pursuing the goals of a political community. Although different communities may pursue different goals, politics is always a practice aimed at providing good answers to the question ‘What shall we do, given our ends and the means at our disposal?’ (Rodríguez-Alcázar et al. 2021).

As regards risk management, communities may have different priorities depending on their circumstances. For example, a wealthy country will normally be more willing to develop precautionary measures to warrant food security than a country suffering famine. In the latter case, policymakers will do well in prioritizing enough food production—for instance, by means of agricultural technologies—over food security, although both are valuable ends for any society and, therefore, should be pursued simultaneously as far as possible. If the PP is to be understood as a political principle (i.e. a norm that establishes a political requirement that stands unless it clashes with another political requirement), it must be flexible enough to make sense of the above intuition. Yet it cannot remain abstract and too general if it is to be of real guidance for public decision-making.

## 6. THE OPERATIONALIZATION OF THE PP AS A POLITICAL PRINCIPLE

Although the PP is a principle, not an algorithm (Holbrook & Briggles 2014), its formulation should be operational enough to be of real guidance in public decision-making. Otherwise, submitting that there is a principle of precaution, and even specifying its content as a political principle, would be futile as regards actual decision-making. Hence, our defence of the PP must include a specific formulation able to work as a sound decision procedure. However, despite that the success of this defence depends on the possibility of having an operational enough formulation, it does not depend on the adequacy of the specific proposal that we will offer here, which is meant to be just a starting point for further debate. In fact, we think that the best political scenario for the PP involves a thorough public debate setting the exact formulation that should guide policymakers in each social context when facing cases of uncertain and morally unacceptable risk.

We think that a promising strategy to work out such a formulation is to settle an ‘argumentation scheme’ to decide on specific appeals to precaution in public affairs. As Stirling (2007, p. 312) argued,

good precautionary policymaking requires ‘subjectivity, argument, deliberation and politics’. Argumentation schemes were developed as tools to assess everyday argumentation. They are ‘typical patterns of defeasible reasoning that occur characteristically in our common, everyday arguments’ (Godden & Walton 2007, p. 267). The idea behind this strategy is to formulate the PP as a rule of practical inference; that is, a rule stating that if certain conditions are met, then certain actions ought to be taken.

By agreeing on a certain argumentation scheme as the paradigm to appeal to precaution in the public domain, a formulation of the PP in these terms will set criteria to assess whether an uncertain risk constitutes a good political reason to adopt precautionary measures. In turn, such a formulation will determine whether specific appeals to precaution are argumentatively sound. Additionally, because argumentation schemes behave as models for both discourse production and discourse assessment, an argumentative scheme for appealing to precaution in public policymaking will provide guidance in a twofold way: it will provide guidelines to create sound appeals to the PP—i.e. appeals that show the premises to be true so that the conclusion holds—and also guidelines to assess any appeal to the PP, since argumentation schemes are typically accompanied by a series of critical questions that serve to determine if the premises, as required by the scheme, are true after all. Accordingly, an Argumentation Scheme for Appealing to Precaution (ASAP) can help political communities to settle their standards of sound appeals to the PP. Although we recommend each political community develop its own specific version of the ASAP, we suggest here a version (ASAP\*) as a plausible starting point (Box 1).

Ideally, the specific ASAP that guides policymaking for a particular community should be democratically established, preferably by means of a thorough public debate within that community that reinforces its overall public acceptance. Moreover, the application of such ASAP to difficult cases should also give rise to public debates in which all the associated critical questions are examined and answered by means of procedures that meet each community’s standards of political deliberation. Particularly, such processes of public deliberation should promote the determination of valuative elements such as the nature and weight of the alleged *V* and *D*, the extent to which *V* may compensate *D* and the actual plausibility of the claim ‘if *T*, then *D*’. In accordance with our minimalist conception of political goodness, these

## Box 1. Proposed Argumentation Scheme for Appealing to Precaution (ASAP\*)

<b>Premises</b>	
P1	The purpose of the target technology <sup>a</sup> /practice, <i>T</i> , is to bring about value, <i>V</i> , which <i>T</i> can produce indeed.
P2	It is scientifically plausible that 'if <i>T</i> , then <i>D</i> ' (i.e. it is possible to establish a causal link between <i>T</i> and <i>D</i> , on the grounds of our best scientific knowledge).
P3	<i>D</i> is a significant disvalue.
P4	There is no morally acceptable scenario in which the potential victims of <i>D</i> would informedly consent to take the risk of suffering <i>D</i> .
P5	Overall, if <i>D</i> were to happen, <i>V</i> would not compensate <i>D</i> .
<b>Conclusion</b>	
C	If there are practicable alternatives, <i>A</i> , that do not involve non-consented risk to achieve <i>V</i> , <i>T</i> shall not be implemented instead of <i>A</i> . If there are no <i>A</i> , but there are satisfactory mitigating measures, <i>M</i> , to avoid or diminish <i>D</i> , <i>T</i> shall not be implemented without implementing <i>M</i> . If neither <i>A</i> nor <i>M</i> exist, then <i>T</i> shall be banned until new evidence suggests that the case needs to be reassessed.
<b>Critical questions associated with the scheme</b>	
Risk assessment	Is there any way to prevent <i>D</i> from occurring if <i>T</i> is implemented?
Harm assessment	Is <i>D</i> really a disvalue? Is it possible to circumscribe <i>D</i> , so that the adoption of mitigating measures (e.g. mitigation, compensation, adaptation) is enough to cope with it satisfactorily?
Assessment of alternatives	Is there an alternative <i>A</i> to bring about <i>V</i> that does not involve risk or whose risk is morally acceptable? Is its cost–benefit ratio assumable?
Moral assessment	Would potential victims consent to take the risk of implementing <i>T</i> if they could? Would potential victims consent to take the risk of implementing <i>T</i> if the distribution of possible <i>D</i> were blind? Is the scenario in which the potential victims would consent morally acceptable?
Political assessment	Could the benefit of <i>V</i> for society, <i>S</i> , in general compensate the damage of <i>D</i> for the possible victims, considered as part of <i>S</i> ?
<sup>a</sup> 'Technology' is used here in the constructivist sense of a complex network relating human actors, non-human beings and processes in a social and legal environment (Latour 2005)	

requirements are not invoked because they provide legitimacy to either the ASAP or its application, but because we suppose, as an empirical hypothesis, that they will help policymakers to make good political decisions, in the sense of good responses to the question, 'what shall we do...?'.  
Taking all this into account, our proposed formulation of the PP would be as follows:

Public decision-making shall conform to a democratically settled ASAP, to the effect that when the premises of this ASAP are taken to obtain, its conclusion shall be made to obtain too.

## 7. ADVANTAGES OF THIS PROPOSAL. TWO EXAMPLES

Although a full-fledged defence of the ASAP or of a specific formulation of it is beyond the scope of this paper, we would like to explain, at least briefly, how they can cope with the main criticisms that the PP has raised and to illustrate the potential of this formula-

tion, both as a legal norm and as a guide for policy-making, by means of 2 contrasting examples.

To begin with, our claim that the PP is a political principle means that in case of uncertain but morally unacceptable risk — which are the circumstances of application of the PP — public decision-making must always honour the PP. Consequently, a sound formulation of the PP must grant that any violation of this specific rule results in politically wrong decision-making. As regards our proposal, it can be observed that since the particular ASAP that is to be used in the final formulation of the PP must effectively put together a community's level of commitment with the precautionary moral obligation and with the rest of the goals and values that this community endorses, such formulation cannot go against good political sense, understood as a matter of providing good responses to the question, 'What shall we do as regards our ends and the means available to achieve them?' Accordingly, our proposal makes the PP a political principle proper in the sense of establishing a political requirement that stands unless it clashes with other political requirements.

Regarding the main practical concerns that the PP has raised, we have pointed out that a sound formulation should make a workable guide for policymaking out of it, free from inconsistency and incoherence and able to prevent abusive uses such as those arising from the manufacturing of uncertainty, illegitimate excesses of zeal and overregulation (Ireland 2009).

Since the ASAP is a valid argumentation scheme, it cannot have instances whose premises lead to contradictory conclusions. Consequently, a formulation of the PP in these terms will be freed from incoherence. As regards inconsistency—in the sense of the possibility of appealing to the PP against the application of the very PP—consider, in turn, how the ASAP\* copes with the strategy of manufacturing uncertainty (Michaels 2008). For example, attempts at neutralising precautionary policies against global warming or the use of hazardous chemical products have not only pivoted on the idea that the threat is uncertain, but also on the idea that adopting precautionary measures may also pose a threat, such as not enjoying products that are, after all, good and safe, or inflicting undue economic costs and lost opportunities. However, according to our proposed formulation, any sound appeal to the PP must begin by granting P1 of the ASAP\*, and this hinders the strategy of manufacturing uncertainty to a great extent. For example, global warming deniers appealing to the PP against precautionary measures to fight global warming would have to begin by showing that the purpose of their target *T*—that is, the measures against global warming—is to bring about some benefit, and that *T* is able to bring about such benefit. Thus, since the purpose of measures against global warming is to bring about the benefit of at least diminishing the catastrophic consequences of global warming, deniers of global warming would have to begin by acknowledging that measures against global warming are able to bring about this benefit. That is, deniers would have to endorse the very reasons that justify these measures against global warming to show that P1 is true—something that is required to carry on their appeal to the PP against these measures, following the ASAP\*.

### 7.1. Appealing to the PP against the free movement of persons in the time of COVID-19

According to the ASAP\*, the target *T* of the appeal to the PP must be a technology or practice whose purpose is to bring about a valuable state of the world

and that is able to deliver it. Thus, a formulation of the PP in these lines sets a dialectical framework in which the benefits of the practice or technology that is in question are considered from the beginning. This feature of the ASAP\* prevents not only the strategy of manufacturing uncertainty but also the abuses derived from appealing to precaution unrestrictedly. Consider, for instance, the decision that many governments worldwide had to make on whether, in what conditions and to what extent, the free movement of people ought to be restricted in response to the COVID-19 pandemic. As Goldner Lang (2023) pointed out, the (in most cases implicit) appeal to the PP to justify measures against COVID-19 sometimes resulted in restrictions to free movement, such as closing borders, that were not recommended in some contexts either by the European Centre for Disease Prevention and Control or by the World Health Organization (WHO). For instance, many scientists and the WHO criticized the decision made by some 50 countries to ban flights from South Africa to try to stop the spread of the Omicron variant of COVID-19 when there was evidence that this variant was globally circulating already (Mallapaty 2021).

Given the ASAP\*, the target *T* of this appeal to the PP could not be COVID-19 itself, because this is not a practice or technology with a certain purpose. Instead, we can consider that the appeal to the PP is made against the practice of free movement of persons in times of the pandemic. This practice was able to bring about something valuable indeed; namely, that people could go on with their lives in times of pandemic with as much normality as possible. In our view, by focusing on this practice instead of focusing on the virus, a more nuanced analysis would have been possible. In the framework of the ASAP\*, this is especially clear as regards P5 and C, since, on the one hand, it is possible to have morally acceptable scenarios in which the risk associated with the free movement of people could be informedly consented by the potential victims (P5). On the other hand, there could be satisfactory mitigating measures *M* to avoid or diminish the risk (C). Furthermore, had the ASAP\* been followed, the specific proposed restrictions would have been evaluated one by one and in each context. While some restrictions would have seemed clearly justified on precautionary grounds (Goldner Lang 2023), in other cases it could have been argued that the state of affairs *V* caused by a particular practice could compensate *D*. In such cases, the ASAP\* would not recommend certain precautionary measures against different practices (contradicting some decisions made by some countries).

Such contextual application of ASAP\* to these targets (e.g. free movement of people, not wearing face masks, not making vaccinations compulsory, etc.) provides a more nuanced approach to policymaking than an ill-conceived, unrestricted appeal to the PP.

On the other hand, a valid instance of the ASAP\* involves empirical claims about the values and preferences of society—namely, in P1, P3, P5 and C. In case the truth value of these claims is contested, it is always possible to inquire what people really value and prefer—for example, by means of surveys, polls, consensus conferences and mechanisms of the sort. This possibility would not be available if we thought of the ends to be pursued by sound appeals to the PP as moral ends or as ‘valuable in themselves’; instead, we would be bounded to a conflict of evaluative intuitions. Finally, regarding future generations, who cannot express their preferences, an interesting feature of the ASAP\* is that it does not require their actual consent or knowing their actual preferences. Indeed, P4 (‘There is no morally acceptable scenario in which the potential victims of *D* would informedly consent to take the risk of suffering *D*’) responds to the moral intuition that it is wrong to put others at risk of suffering consequences that it is unthinkable for us that they may find acceptable—even if they end up thinking that the harm is actually acceptable for them.

## 7.2. Ireland vs. UK on the release of nuclear waste into the Irish Sea

The ASAP\* not only specifies the conditions for taking precautionary measures, but it can also sanction a variety of possible measures to be taken when these conditions obtain. Furthermore, the specific conclusion of the ASAP\* establishes an order of prevalence for these measures, so that banning proposals is not necessarily the only output of sound appeals to the PP: implementing alternatives to a proposal or making the risk politically acceptable by adopting mitigating measures are other possibilities. As a result, this formulation can avoid scenarios of illegitimate excess of zeal and the absolutist attitude that turns the PP into a net obstacle for responsible research and innovation, inviting public participation to the debate about technologies.

The distinction between strong and weak formulations of the PP has frequently been associated with the question of who has the burden of proof in case of conflict: either those who ask for precautionary measures must show that the proposal entails risks or

those who stand for the proposal must show that it is safe. In our formulation, a sound appeal to the PP requires establishing a plausible causal chain between the proposal and the damage (P2). In this respect, those who argue for precautionary measures do have some burden of proof: they cannot just ask for measures on no grounds; rather, they must show that there is a threat that is scientifically plausible, although such explanation does not have to determine the precise probability of the threat of harm (Hartzell-Nichols 2014). Thus, our proposed formulation is neither too strong nor too weak in this respect: neither any possible morally unacceptable threat triggers precautionary measures nor precautionary measures require proof that the threat can happen. Besides, since appeals to the PP would require making a specific proposal on what to do when the premises obtain—that is, setting a conclusion for the ASAP\*—this formulation of the PP avoids rewarding ignorance (Manson 2002). Those appealing to the PP against a target technology or practice would have to build a case showing not only that the premises of the ASAP\* obtain, but also that there are either practicable alternatives to *T*, or satisfactory mitigating measures against *D*, or they would have to contend that there are neither practicable alternatives nor satisfactory mitigating measures so that *T* must be banned. In turn, those opposing the appeal to the PP would have to show that at least one of the premises does not obtain, so that the appeal to the PP does not stand. If the ASAP\* were enforced by the law, then a legal appellation to the PP would typically have a plaintiff making the former case and a defendant making the latter, so that the judges would have to determine whose case stands. Consider the following example to illustrate this point:

In 2001, Ireland requested that the International Tribunal for the Law of the Sea prescribe measures against a decision made by the UK to authorize a mixed oxide fuel plant and a thermal oxide reprocessing plant to release nuclear waste into the Irish Sea. Ireland argued that living organisms could be affected even by low-dose radiation, given the longevity of the radionuclides. So, according to Ireland (International Tribunal for the Law of the Sea 2001a), who repeatedly invoked the PP, the UK ought to either take precautionary actions or stop the release. The UK answered that ‘it is generally accepted that it [the PP] can operate only where there are some reasonable grounds for concern’ and that ‘Ireland does not even make a preliminary showing of such grounds for concern’ (United Kingdom 2001, p. 428–429). The UK claimed that ‘For an application

for provisional measures to be sustainable, it must be supported by a basic foundation of credible evidence of irreparable prejudice or serious harm' (United Kingdom 2001, p. 443).

The Tribunal avoided mentioning the PP in its subsequent Order (International Tribunal for the Law of the Sea 2001b). In addition, most judges also abstained from mentioning the PP in their written separate Opinions, although they agreed with the Order and with the UK that there was not sufficient proof of serious harm (Caminos et al. 2001). But 2 judges explicitly discussed the relevance of the PP in their separate Opinions. They agreed that the PP was relevant to this case. Additionally, both pointed out that one consequence of invoking the PP was reversing the attribution of the burden of proof made by the Tribunal in its Order. One of these judges complained that the Tribunal had decided 'to give the United Kingdom, and not Ireland, the benefit of the doubt about the risk of harm alleged by Ireland' (Székely 2001, p. 147), while the second one wrote 'a state interested in undertaking or continuing a particular activity has to prove that such activities will not result in any harm' (Wolfrum 2001, p. 134). Both statements, then, centered the discussion on the question of who bore the burden of proving that the release of waste did/did not pose a serious risk, without reaching an agreement (Yin & Zou 2021).

If a formulation of the PP in terms of the ASAP\* had been in force in international law, it would have settled the question of whether the PP was relevant to the case and would have overcome the usual debates concerning who has the burden of proof. Had the ASAP\* been enforced in the relevant legislation, it would have been clear—contrary to the opinion of the UK and the Tribunal and in agreement with judges Székely and Wolfrum, although not for the same reasons—that the case was about judging an appeal to the PP, and its application would have been made more straightforward. Specifically, the procedure would have been as follows:

Because of the plaintiff's appeal to the PP, the Tribunal would have had to determine whether Ireland's plea constitutes a valid instance of the ASAP\* or not. The debates show that the crucial question in this case was P2, which would run as follows:

It is plausible, to the best of our scientific knowledge, that 'if the release of nuclear waste into the Irish Sea continues, it will harm living organisms, including human beings'.

The question is no longer who bears the burden of proving that the harm is/is not likely to occur. According to the ASAP\*, what is needed for a sound appeal

to the PP is a scientifically plausible explanation of how this harm might be the case, provided, among other conditions, that (P4) there is no morally acceptable scenario in which the potential victims of the release (the people of Ireland and the UK living around the Irish Sea) would informedly consent to take the risk of suffering the damage. The authorities of Ireland or the UK would be expected to prove nothing as regards the likelihood of the damage. Nevertheless, as concerned parties, both countries would be expected to contribute evidence and arguments to the hearings regarding whether the scientific explanation of how *T* and *D* are related was plausible or not. The same can be said regarding the rest of the premises of Ireland's plea—specifically, P3, P4 and P5. Thus, instead of denying the plausibility of the risk associated with the release of nuclear waste, the UK could have focused, for example, on the idea that the possible harm would not be a significant disvalue—which was indeed part of its allegation.

## 8. CONCLUSIONS

From a theoretical perspective, critics have challenged the possibility of embedding precautionary policymaking as a principle. To this type of criticism, we have argued that when the risk is morally unacceptable, precaution is morally mandatory. However, this does not make the PP a moral principle, but rather a political one whose rationale is based on the fact that contemporary societies wish to avoid morally unacceptable risks as well as pursuing other goals, aspirations and values.

From a practical perspective, critics have challenged the possibility of formulating the PP in an operative, coherent and consistent manner. Our response has been to provide a workable formulation of the PP in terms of an ASAP\*, able to determine the strength of specific appeals to precaution as well as foster and assist deliberation in controversial cases. This ASAP\* is meant to be only a starting point for the kind of public deliberation that, in our opinion, should settle the final formulation of the PP. In our view, this account of the PP as a political principle and our proposed formulation have the following advantages:

1. They justify embedding precaution as a principle proper.
2. They avoid inconsistency, incoherence and inoperativity. They adequately distribute the burden of proof among opposing parties and avoid rewarding ignorance.

3. They sanction the possibility of balancing the precautionary moral obligation with other goals and values that we may also endorse, including proaction in specific cases.
4. They provide an operative guide for decision-making by means of a deliberative framework that fosters collective decision-making instead of the mere aggregation of votes (Dietrich & List 2007). Yet because deliberation would be guided by an ASAP, parties would not be required to make overall assessments on the case but rather specific assessments on whether each of the premises obtains or not, also assisted by a set of associated critical questions. In addition, the fact that these premises are made explicit and publicly assessed holds the whole deliberation procedure subject to scrutiny and democratic control, which is weakened when procedures are assisted by artificial intelligence or when they deeply depend on formal calculations or mechanisms that are much too complex for laypeople. This is of especial significance regarding those affected by the final decisions because they should not feel that such decisions remain incomprehensible due to the way in which they were reached.

Our proposal does not provide responses to other important questions such as who is to pay for the precautionary measures to be finally adopted (Turner & Hartzell 2004) or for the expenses of checking whether the conditions for taking measures hold (Holbrook & Briggles 2014). Despite their relevance, the responses to these questions do not really belong to the PP itself, since the principle is supposed to hold independently of the economic organization of each community. Indeed, the argumentative setting of our proposed formulation allows for the integration of the PP into democratic and trackable public decision-making procedures.

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