# AC

## Framework

The standard is **maximizing happiness**.

First, respect for human worth would justify util. **Cummiskey 90**[[1]](#footnote-1)

We must not obscure the issue by characterizing this type of case as the sacrifice of individuals for some abstract “social entity.” It is not a question of some persons having to bear the cost for some elusive “overall social good.” Instead, the question is whether some persons must bear the inescapable cost for the sake of other persons. Robert Nozick, for example, argues that “to use a person in this way does not sufficiently respect and take account of the fact that he is a separate person, that his is the only life he has.” But why is this not equally true of all those whom we do not save through our failure to act? **By emphasizing solely the one who must bear the cost if we act, we fail to** sufficiently **respect** and take account of **the many other** separate **persons**, each with only one life, **who will bear the cost of our inaction**. In such a situation, what would a conscientious Kantian agent, an agent motivated by the unconditional value of rational beings, choose? A morally good agent recognizes that the basis of all particular duties is the principle that “rational nature exists as an end in itself”. Rational nature as such is the supreme objective end of all conduct. If one truly believes that all rational beings have an equal value, then the rational solution to such a dilemma involves maximally promoting the lives and liberties of as many rational beings as possible. In order to avoid this conclusion, the non-consequentialist Kantian needs to justify agent-centered constraints. As we saw in chapter 1, however, even most Kantian deontologists recognize that agent-centered constraints require a non- value-based rationale. But we have seen that Kant’s normative theory is based on an unconditionally valuable end. How can a concern for the value of rational beings lead to a refusal to sacrifice rational beings even when this would prevent other more extensive losses of rational beings? If the moral law is based on the value of rational beings and their ends, then what is the rationale for prohibiting a moral agent from maximally promoting these two tiers of value? If I sacrifice some for the sake of others, I do not use them arbitrarily, and I do not deny the unconditional value of rational beings. **Persons** may **have “dignity**, that is, an unconditional and incomparable worth” **that transcends any market value, but persons also have** a fundamental **equality that dictates that some must** sometimes **give way for the sake of others.** The concept of the end-in-itself does not support the view that we may never force another to bear some cost in order to benefit others.

Second, util is epistemologically necessary. Everyone values happiness whether they want to or not. Even a skeptic wouldn’t shoot themselves in the foot.

Third, personal identity is indeterminate because a brain could be split into two future people which proves only end states can be the object of evaluation.

And fourth, policy makers cant evaluate side constraints because they have to consider trade offs between multiple people. This is specifically true of environmental policy which affects millions, so its most specific to the resolution.

Advocacy: Developing countries should accept the Precautionary Principle in contexts where environmental protection conflicts with resource extraction, consistent with the guidelines of clean production, zero discharge, and reverse onus.

**Aff gets RVIs** on I meets and counter-interps because

(a) 1AR time skew means I can’t cover theory and still have a fair shot at substance.

(b) no-risk theory gives him a free source of no-risk offense which allows him to moot the AC.

No generic defense. The plan rectifies any flaws with the PP.

**Collins 5**

Lynda M. Collins (environmental attorney). “Strange Bedfellows? The Precautionary Principle and Toxic Tort: A Tort Paradigm for the 21st Century.” 2005 Environmental Law Institute®, Washington, DC.

Prof. Thomas McGarity argues that the “essence” of the precautionary principle “can be captured in three familiar phrases: look before you leap; it is better to be safe than sorry; and when in doubt, err on the side of safety.”52 The precautionary principle rejects risk-based assumptions about the capacity of the environment (including human bodies) to assimilate contaminants on the one hand and the ability of science to predict this capacity on the other.53 From a normative perspective, the precautionary principle recognizes an ethical imperative to do the best we can to avoid creating risks of serious or irreversible harm. **The precautionary principle has been criticized for its amorphous nature**, and **Thornton** concedes that the principle is too vague to function as a regulatory standard.55 Accordingly, he **proposes three** additional **policy guidelines to provide specific guidance on** the **implementation** of the precautionary principle.56 **These are clean production, zero discharge, and reverse onus.** Clean Production mandates a shift from our current focus on pollution control to a proactive and precautionary rule favoring pollution prevention.57 It requires that industry make use of the most benign available methods and materials and seek to prevent the release of hazardous materials by preventing their production in the first place.58 The policy of zero discharge prohibits absolutely the release of persistent and/or bioaccumulative chemicals.59 Reverse onus would invert current regulatory policy by requiring proponents of synthetic chemicals to demonstrate their safety before being permitted to produce and release them.60 As Thornton points out, **this is the policy currently in force with** respect to **pharmaceuticals.**61 Further **precedent** for such an approach **can be found in environmental assessment statutes**, which require that proponents of physical projects elucidate the environmental impact of proposed projects before approval can be granted.62 In contrast to risk paradigm approaches, “[r]ather than asking how much toxic pollution we can live with, the precautionary principle [focuses on the] kind of . . . world we want to live in, and provides a decision-making framework for getting there.”63 **Thornton’s** ecological **paradigm provides a viable policy framework to guide** the **implementation** of the precautionary principle in statutory environmental law. The remainder of this Article examines the extent to which tort law can or should, in turn, embrace this ecological paradigm in its own treatment of environmental wrongs.

**The PP shifts the legal burden in environmental cases towards the plaintiffs. That’s key to justice in tort law.**

**Collins 5**

Lynda M. Collins (environmental attorney). “Strange Bedfellows? The Precautionary Principle and Toxic Tort: A Tort Paradigm for the 21st Century.” 2005 Environmental Law Institute®, Washington, DC.

**Scientists and legal scholars have made a compelling case for a precautionary approach to** statutory **environmental regulation. Common-law tort must** also **embrace a precautionary paradigm** if it is to realize its potential **to play a meaningful role in arresting environmental degradation and doing justice to the victims of environmental torts.** Given the important role of tort law in our hybrid legal system of environmental protection, it is incumbent on scholars and jurists alike to ensure that tort improves its ability to respond to environmental wrongdoing. Indeed, tort’s response to environmental pollution will play a significant role in determining the extent to which ordinary people are exposed to untested toxic chemicals in the coming decades.153 In order to contribute effectively to environmental protection, **tort needs to embrace the** ecological paradigm and abandon the **scientifically questionable assumptions of** the **risk** and injury **paradigms.** As a starting point, the single **cause-of-action** rule **should be relaxed in all toxic tort cases** in order to allow for early deterrence and full compensation of injured plaintiffs. **For cases in which a plaintiff has not yet fallen ill, toxic battery** (coupled with a relaxation of the single cause-of-action rule) **offers a**n appropriately **precautionary tort response.** For cases in which health damage has already occurred, **the ecological paradigm demands a reversal of the burden of proof** on generic causation where a defendant has failed to adequately research its product. **All three approaches vindicate the individual’s interest in bodily integrity, and, by proxy, our collective** interest in **ecological integrity.** Until trees have standing,154 these approaches may be the most effective way for the common law to do its part in safeguarding the environment.

## Contention 1 is Food Crises

Prioritizing resource extraction makes collapse of civilization and food crises inevitable. Sustainable development solves.

**Luntz 3-19** writes[[2]](#footnote-2)

**Our** industrial **civilization faces the same threats of collapse that** earlier versions such as **the Mayans experienced**, a study to be published in Ecological Economics has warned. The idea is far from new, but the authors have put new rigor to the study of how so many previous societies collapsed, and why ours could follow. Lead author Mr Safa Motesharrei is no wild-eyed conspiracy theorist. Motesharrei is a graduate student in mathematics at the National Socio-Environmental Synthesis Center, a National Science Foundation-supported institution, and the research was done with funding from NASA's Goddard Space Flight Center. "The fall of the Roman Empire, and the equally (if not more) advanced Han, Mauryan, and Gupta Empires, as well as so many advanced Mesopotamian Empires, are all testimony to the fact that advanced, sophisticated, complex, and creative civilizations can be both fragile and impermanent," the forthcoming paper states Two key social features are identified that contributed to the collapse of every civilization studied: “The stretching of resources due to the strain placed on the ecological carrying capacity," and "The economic stratification of society into Elites [rich] and Masses (or "Commoners") [poor]". If these look familiar, so do the factors that make up the resource side of the equation, with climatic change, and scarcity of water and energy key among them, although for others climate variation was a matter of bad luck, rather than their own actions. The model **Motesharrei** used, Human And Nature Dynamics (HANDY), **explores the relationship between population and resources**, drawing heavily on predator-prey models used by ecologists. Four key factors were included in the model: Elites, Commoners, nature and wealth. Equations of how these interact were created with varying inputs. The outcomes were not pretty. The timing and shape of collapses varied, but the **societies that most closely resembled our own doomed themselves, through overuse of resources** exacerbated by economic stratification. In one scenario many commoners do make it into the elite population at year 750, but the “scarcity of workers” caused a collapse by year 1000. In another so many of the Earth's resources are consumed that society, and the ecology of the planet, are doomed by the year 500. “It is important to note that in both of these scenarios, the Elites — due to their wealth — do not suffer the detrimental effects of the environmental collapse until much later than the Commoners,” the paper notes. If those year numbers seem comfortingly far off, be aware that the year zero in these models is well behind us. Nevertheless, contrary to much of the reporting, the model does not provide a useful timeline for when we can expect to see the world we live in turn into something that resembles a post-apocalyptic nightmare, although **studies of** the **convergence of climate and resource challenges suggest we may witness drastic food crises within a little over a decade**. In every economic bubble people looking back to past crashes are told “this time it is different”. Certainly some things have changed for modern civilization compared to the others Motesharrei has looked at. Technological developments that provide access to greater resources is the most frequently mentioned difference. Motesharrei responds, “**Tech**nological change **can raise** the **efficiency of resource use, but** it **also** tends to raise both **per capita** resource **consumption and the scale of** resource **extraction**, so that, absent policy effects, the increases in consumption often compensate for the increased efficiency of resource use.” One advantage we do have, however, is much greater knowledge of what has gone wrong in the past, and therefore the capacity to build models like HANDY. In a presentation of an earlier draft of this work in 2012 Motesharrei noted, “Simple models provide a great intuition and can teach us invaluable points. It is crucial to have a measure that can give us an early warning of collapse. Carrying Capacity tells us when overshoot happens, and this can be defined by noticing the decline in wealth.” Some coverage of the announcement has described disaster as inevitable, but that is not the paper's conclusion at all. “**Collapse can be avoided** and population can reach equilibrium **if** the **per capita** rate of **depletion** of nature **is reduced to a sustainable level**, and if resources are distributed in a reasonably equitable fashion,” it argues. Although the study has reportedly passed peer review it is yet to be published. It received global attention after a pre-release version was provided to The Guardian.

Food crises independently escalate to World War 3. **Calvin 98** writes[[3]](#footnote-3)

The population-crash scenario is surely the most appalling. **Plummeting crop yields would cause** some **powerful countries to try to take over** their **neighbors or distant lands** -- if only because **their armies,** unpaid and **lacking food, would go marauding**, both at home and across the borders. The **better-organized countries would attempt to use their armies, before they fell apart entirely, to take over countries with significant remaining resources,** driving out or starving their inhabitants if not using modern weapons to accomplish the same end: **eliminating competitors for the remaining food. This** would be a worldwide problem -- and **could lead to a Third World War** -- but Europe's vulnerability is particularly easy to analyze. The last abrupt cooling, the Younger Dryas, drastically altered Europe's climate as far east as Ukraine. Present-day Europe has more than 650 million people. It has excellent soils, and largely grows its own food. It could no longer do so if it lost the extra warming from the North Atlantic.

Sustainable development independently solves extinction. **Barry 13** writes[[4]](#footnote-4)

Science needs to do a better job of considering worst-case scenarios regarding continental- and global-scale ecological collapse. The loss of biodiversity, ecosystems, and landscape connectivity reviewed here shows clearly that ecological collapse is occurring at spatially extensive scales. **The collapse of the biosphere and** complex life, or eventually even **all life, is a possibility that needs to be** better understood and **mitigated** against. A tentative case has been presented here that terrestrial **ecosystem loss is at** or near **a** planetary **boundary**. It is suggested that a 66% of Earth's land mass must be maintained in terrestrial ecosystems, to maintain critical connectivity necessary for ecosystem services across scales to continue, including the biosphere. Yet various indicators show that around 50% of Earth's terrestrial ecosystems have been lost and their services usurped by humans. Humanity may have already destroyed more terrestrial ecosystems than the biosphere can bear. **There exists a major need for** further research into how much land must be maintained in a natural and agroecological state to meet landscape and bioregional **sustainable development goals** while maintaining an operable biosphere. It is proposed that a critical element in determining the threshold where terrestrial ecosystem loss becomes problematic is where landscape connectivity of intact terrestrial ecosystems erodes to the point where habitat patches exist only in a human context. Based upon an understanding of how landscapes percolate across scale, it is recommended that 66% of Earth's surface be maintained as ecosystems; 44% as natural intact ecosystems (2/3 of 2/3) and 22% as agroecological buffer zones. Thus nearly half of Earth must remain as large, connected, intact, and naturally evolving ecosystems, including old-growth forests, to provide the context and top-down ecological regulation of both human agroecological, and reduced impact and appropriately scaled industrial activities. Given the stakes, it is proper for political ecologists and other Earth scientists to willingly speak bluntly if we are to have any chance of averting global ecosystem collapse. A case has been presented that Earth is already well beyond carrying capacity in terms of amount of natural ecosystem habitat that can be lost before the continued existence of healthy regional ecosystems and the global biosphere itself may not be possible. Cautious and justifiably conservative science must still be able to rise to the occasion of global ecological emergencies that may threaten our very survival as a species and planet. Those knowledgeable about planetary boundaries – and abrupt climate change and terrestrial ecosystem loss in particular – must be more bold and insistent in conveying the range and possible severity of threats of global ecosystem collapse, while proposing sufficient solutions. It is not possible to do controlled experiments on the Earth system; all we have is observation based upon science and trained intuition to diagnose the state of Earth's biosphere and suggest sufficient ecological science–based remedies. If Gaia is alive, she can die. Given the strength of life-reducing trends across biological systems and scales, there is a need for a rigorous research agenda to understand at what point the biosphere may perish and Earth die, and to learn what configuration of ecosystems and other boundary conditions may prevent her from doing so. We see death of cells, organisms, plant communities, wildlife populations, and whole ecosystems all the time in nature – extreme cases being desertification and ocean dead zones. There is no reason to dismiss out of hand that **the Earth** System **could die if critical thresholds are crossed**. We need as Earth scientists to better understand how this may occur and bring knowledge to bear to avoid global ecosystem and biosphere collapse or more extreme outcomes such as biological homogenization and the loss of most or even all life. To what extent can a homogenized Earth of dandelions, rats, and extremophiles be said to be alive, can it ever recover, and how long can it last? **The risks of global ecosystem collapse and** the **need for** strong response to achieve global ecological **sustainability** **have been understated** for decades. If indeed there is some possibility that our shared biosphere could be collapsing, there needs to be further investigation of what sorts of sociopolitical responses are valid in such a situation. Dry, unemotional scientific inquiry into such matters is necessary – yet more proactive and evocative political ecological language may be justified as well. We must remember we are speaking of the potential for a period of great dying in species, ecosystems, humans, and perhaps all being. It is not clear whether this global ecological emergency is avoidable or recoverable. It may not be. But we must follow and seek truth wherever it leads us.
Planetary boundaries have been quite anthropocentric, focusing upon human safety and giving relatively little attention to other species and the biosphere's needs other than serving humans. Planetary boundaries need to be set that, while including human needs, go beyond them to meet the needs of ecosystems and all their constituent species and their aggregation into a living biosphere. Planetary boundary thinking needs to be more biocentric. I concur with Williams (2000) that what is needed is an Earth System–based conservation ethic – based upon an "Earth narrative" of natural and human history – which seeks as its objective the "complete preservation of the Earth's biotic inheritance." Humans are in no position to be indicating which species and ecosystems can be lost without harm to their own intrinsic right to exist, as well as the needs of the biosphere. For us to survive as a species, logic and reason must prevail (Williams 2000). Those who deny limits to growth are unaware of biological realities (Vitousek 1986). There are strong indications humanity may undergo societal collapse and pull down the biosphere with it. The longer dramatic reductions in fossil fuel emissions and a halt to old-growth logging are put off, the worse the risk of abrupt and irreversible climate change becomes, and the less likely we are to survive and thrive as a species. Human survival – entirely dependent upon the natural world – depends critically upon both keeping carbon emissions below 350 ppm and maintaining at least 66% of the landscape as natural ecological core areas and agroecological transitions and buffers. Much of the world has already fallen below this proportion, and in sum the biosphere's terrestrial ecosystem loss almost certainly has been surpassed, yet it must be the goal for habitat transition in remaining relatively wild lands undergoing development such as the Amazon, and for habitat restoration and protection in severely fragmented natural habitat areas such as the Western Ghats. The human family faces an unprecedented global ecological emergency as reckless growth destroys the ecosystems and the biosphere on which all life depends. Where is the sense of urgency, and what are proper scientific responses if in fact Earth is dying? Not speaking of worst-case scenarios – the collapse of the biosphere and loss of a living Earth, and mass ecosystem collapse and death in places like Kerala – is intellectually dishonest. We must consider the real possibility that **we are pulling the biosphere down with us**, setting back or eliminating complex life. The 66% / 44% / 22% threshold of terrestrial ecosystems in total, natural core areas, and agroecological buffers gets at the critical need to maintain large and expansive ecosystems across at least 50% of the land so as to keep nature connected and fully functional. We need an approach to planetary boundaries that is more sensitive to deep ecology to ensure that habitable conditions for all life and natural evolutionary change continue. A terrestrial ecosystem boundary which protects primary forests and seeks to recover old-growth forests elsewhere is critical in this regard. In old forests and all their life lie both the history of Earth's life, and the hope for its future. The end of their industrial destruction is a global ecological imperative. Much-needed dialogue is beginning to focus on how humanity may face systematic social and ecological collapse and what sort of community resilience is possible. There have been ecologically mediated periods of societal collapse from human damage to ecosystems in the past (Kuecker and Hall 2011). What makes it different this time is that the human species may have the scale and prowess to pull down the biosphere with them. It is fitting at this juncture for political ecologists to concern themselves with both legal regulatory measures, as well as revolutionary processes of social change, which may bring about the social norms necessary to maintain the biosphere. Rockström and colleagues (2009b) refer to the need for "novel and adaptive governance" without using the word revolution. Scientists need to take greater latitude in proposing solutions that lie outside the current political paradigms and sovereign powers. Even the Blue Planet Laureates' remarkable analysis (Brundtland et al. 2012), which notes the potential for climate change, ecosystem loss, and inequitable development patterns neither directly states nor investigates in depth the potential for global ecosystem collapse, or discusses revolutionary responses. UNEP (2012) notes abrupt and irreversible ecological change, which they say may impact life-support systems, but are not more explicit regarding the profound human and ecological implications of biosphere collapse, or the full range of sociopolitical responses to such predictions. More scientific investigations are needed regarding alternative governing structures optimal for pursuit and achievement of bioregional, continental, and global sustainability if we are maintain a fully operable biosphere forever. **An economic system based** up**on endless growth that views ecosystems** necessary for planetary habitability **primarily as resources to be consumed cannot exist for long**. Planetary boundaries offer a profoundly difficult challenge for global governance, particularly as increased scientific salience does not appear to be sufficient to trigger international action to sustain ecosystems (Galaz et al. 2012). If indeed the safe operating space for humanity is closing, or the biosphere even collapsing and dying, might not discussion of revolutionary social change be acceptable? Particularly, if there is a lack of consensus by atomized actors, who are unable to legislate the required social change within the current socioeconomic system. By not even speaking of revolutionary action, we dismiss any means outside the dominant growth-based oligarchies. In the author's opinion, it is shockingly irresponsible for Earth System scientists to speak of geoengineering a climate without being willing to academically investigate revolutionary social and economic change as well. It is desirable that the current political and economic systems should reform themselves to be ecologically sustainable, establishing laws and institutions for doing so. Yet there is nothing sacrosanct about current political economy arrangements, particularly if they are collapsing the biosphere. Earth requires all enlightened and knowledgeable voices to consider the full range of possible responses now more than ever.
One possible solution to the critical issues of terrestrial ecosystem loss and abrupt climate change is a massive and global, natural ecosystem protection and restoration program – funded by a carbon tax – to further establish protected large and connected core ecological sustainability areas, buffers, and agro-ecological transition zones throughout all of Earth's bioregions. Fossil fuel emission reductions must also be a priority. It is critical that humanity both stop burning fossil fuels and destroying natural ecosystems, as fast as possible, to avoid surpassing nearly all the planetary boundaries. In summation, we are witnessing the collective dismantling of the biosphere and its constituent ecosystems which can be described as ecocidal. **The loss of a species is tragic**, of an ecosystem widely impactful, **yet with the loss of the biosphere all life may be gone**. Global ecosystems when connected for life's material flows provide the all-encompassing context within which life is possible. The miracle of life is that life begets life, and the tragedy is that across scales when enough life is lost beyond thresholds, living systems die.

Sustainable development turns poverty

**Amechi 10** writes[[5]](#footnote-5)

**Environmental degradation and poverty are** inextricably **intertwined**.5 The consequence of this linkage is a vicious cycle in which poverty causes the degradation of the environment, and such degradation in turn perpetuates more poverty.6 As aptly observed by Fabra ‘…poverty and environmental degradation are often bound together in a mutually reinforcing vicious cycle, and thus human rights abuses related to poverty can be both cause and effects of environmental problems’.7 It follows that if poverty is the main cause of environmental degradation in Africa, then policies, programmes and legal provisions (regulations, bylaws, rules etc) designed to protect the environment in the region will be unsuccessful without a significant improvement in the living standards, wellbeing and livelihoods of the poor.8 However, this is not an exclusive relationship as the protection of the environment is vital to the achievement of poverty reduction in Africa.9 This is due to the fact that the poor in Africa, who are mostly found in the rural areas of the region, are basically reliant on resources obtainable from their environment for sustenance, and hence, are severely affected by environmental degradation.10 As aptly stated by Kante, ‘for the poor, nature offers a series of goods of inestimable value, on which they depend absolutely: That sums up their life. **Environmental damage**, which represents a financial loss for the rich, **is** a much more **serious** matter **for the poor, leading to** the **loss of their livelihood’.**11 Therefore, it can be argued that **any sustainable approach to** the **reduction of poverty** in Africa **requires** an **improvement of the** natural **resource base** upon which most of the poor are dependent on.12 **This** argument **has been recognised by** various **experts with regard to** the realisation of **the** Millennium Development Goals (**MDGs**)**, a** poverty reduction **strategy** that seeks to improve the well-being and livelihood of the poor in Africa.13 The MDGs are now **generally accepted as a blueprint for poverty reduction and** overall **sustainable development of developing countries** in the 21st century.14

Food crisis causes conflict and instability which kills compromise over AI.

**Tomasik 13** writes[[6]](#footnote-6)

As a general rule, less crop cultivation now probably implies more food stability in the future. One clear example is in the area of topsoil loss as discussed above. John Crawford explains: water will reach a crisis point. This issue is already causing conflicts in India, China, Pakistan and the Middle East and before climate change and food security really hit, the next wars are likely to be fought over unsustainable irrigation. Even moderately degraded soil will hold less than half of the water than healthy soil in the same location. If you're irrigating a crop, you need water to stay in the soil close to the plant roots. [...] Soil erosion is most serious in China, Africa, India and parts of South America. **If the food supply goes down,** then obviously, **the price goes up. The crisis** points **will hit the poorest countries hardest, in particular those which rely on imports**: Egypt, for example, is almost entirely dependent on imports of wheat. The capacity of the planet to produce food is already causing conflict. A lot of people argue that food price hikes caused the Arab spring, and may even have contributed to the recent violence following the release of an anti-Islam film. In general, consumption of more food crops implies higher prices on the world market. From "Food Insecurity and Violent Conflict: Causes, Consequences, and Addressing the Challenges" by Henk-Jan Brinkman and Cullen S. Hendrix (p. 4): **is food insecurity** itself **a cause of conflict? Based on** a review of **recent research, the answer is a highly qualified yes**. **Food insecurity, especially when caused by higher food prices, heightens** the risk of **democratic breakdown, civil conflict**, protest, rioting, **and communal conflict**. The evidence linking food insecurity to interstate conflict is less strong, though **there is** some **historical evidence linking declining ag**ricultural **yields to** periods of **regional conflict in Europe and Asia**. That said, the effects of these rebellions on democracy can be both negative and positive (p. 7): Food insecurity, proxied by low availability of calories for consumption per capita, makes democratic breakdown more likely, especially in higher-income countries, where people expect there to be larger social surpluses that could be invested to reduce food insecurity (Reenock, Bernhard and Sobek, 2007). Though statistical evidence is lacking, rising food prices have been implicated in the wave of demonstrations and transitions from authoritarian rule to fledgling democracy in some countries across North Africa and the Middle East in 2011. There are some historical precedents for this: a bad harvest in 1788 led to high food prices in France, which caused rioting and contributed to the French revolution in 1789; and the wave of political upheaval that swept Europe in 1848 was at least in part a response to food scarcity, coming after three below-average harvests across the continent (Berger and Spoerer 2001). Most of these conflicts occur in poor countries and so are less likely to influence AGI arms races among major world powers. Still, it seems plausible that the **destabilizing consequences of environmental degradation are net harmful for compromise prospects among** the **big players in AGI development** in the long term.

International conflict risks an AI arms race involving military robotics.

**Tomasik 4-3** writes[[7]](#footnote-7)

**Government AI development could go wrong** in several ways. Probably most on LW feel the prevailing scenario is that **governments would botch the process by not realizing** the **risks at hand. It's also possible that governments would use** the **AI for** malevolent, **totalitarian purposes**. It seems that **both** of these bad scenarios **would be exacerbated by international conflict. Greater hostility means countries are more inclined to use AI as a weapon**. Indeed, **whoever builds the first AI can take over the world, which makes building AI the ultimate arms race**. A USA-China race is one reasonable possibility. Arms races encourage risk-taking -- being willing to skimp on safety measures to improve your odds of winning ("Racing to the Precipice"). In addition, the weaponization of AI could lead to worse expected outcomes in general. CEV seems to have less hope of success in a Cold War scenario. ("What? You want to include the evil Chinese in your CEV??") With a pure CEV, presumably it would eventually count Chinese values even if it started with just Americans, because people would become more enlightened during the process. However, when we imagine more crude democratic decision outcomes, this becomes less likely. 5. Ways to avoid an arms race Averting an AI arms race seems to be an important topic for research. It could be partly informed by the Cold War and other nuclear arms races, 'President Reagan and General Secretary Gorbachev signing the INF Treaty in the East Room of the White House.' By White House Photographic Office [Public domain], via Wikimedia Commons: https://commons.wikimedia.org/wiki/File:Reagan\_and\_Gorbachev\_signing.jpg as well as by other efforts at nonproliferation of chemical and biological weapons. Forthcoming robotic and nanotech weapons might be even better analogues of AI arms races than nuclear weapons because these newer technologies can be built more secretly and used in a more targeted fashion. Apart from more robust arms control, other factors might help: Improved international institutions like the UN, allowing for better enforcement against defection by one state. In the long run, a scenario of global governance would likely be ideal for strengthening international cooperation, just like nation states reduce intra-state violence. Better construction and enforcement of nonproliferation treaties. Improved game theory and international-relations scholarship on the causes of arms races and how to avert them. (For instance, arms races have sometimes been modeled as iterated prisoner's dilemmas with imperfect information.) How to improve verification, which has historically been a weak point for nuclear arms control. (The concern is that if you haven't verified well enough, the other side might be arming while you're not.) Moral tolerance and multicultural perspective, aiming to reduce people's sense of nationalism. (In the limit where neither Americans nor Chinese cared which government won the race, there would be no point in having the race.) Improved trade, democracy, and other forces that historically have reduced the likelihood of war. 6. Are these efforts cost-effective? World peace is hardly a goal unique to effective altruists (EAs), so we shouldn't necessarily expect low-hanging fruit. On the other hand, projects like nuclear nonproliferation seem relatively underfunded even compared with anti-poverty charities. I suspect more direct MIRI-type research has higher expected value, but among EAs who don't want to fund MIRI specifically, encouraging donations toward international cooperation could be valuable, since it's certainly a more mainstream cause. I wonder if GiveWell would consider studying global cooperation specifically beyond its indirect relationship with catastrophic risks. 7. Should we publicize AI arms races? When I mentioned this topic to a friend, he pointed out that we might not want the idea of AI arms races too widely known, because then governments might take the concern more seriously and therefore start the race earlier -- giving us less time to prepare and less time to work on FAI in the meanwhile. From David Chalmers, "The Singularity: A Philosophical Analysis" (footnote 14): When I discussed these issues with cadets and staff at the West Point Military Academy, the question arose as to whether the US military or other branches of the government might attempt to prevent the creation of AI or AI+, due to the risks of an intelligence explosion. The consensus was that they would not, as such prevention would only increase the chances that AI or AI+ would first be created by a foreign power. One might even expect an AI arms race at some point, once the potential consequences of an intelligence explosion are registered. According to this reasoning, although AI+ would have risks from the standpoint of the US government, the risks of Chinese AI+ (say) would be far greater. We should take this information-hazard concern seriously and remember the unilateralist's curse. If it proves to be fatal for explicitly discussing AI arms races, we might instead encourage international cooperation without explaining why. Fortunately, it wouldn't be hard to encourage international cooperation on grounds other than AI arms races if we wanted to do so. Also note that a government-level arms race could easily be preferable to a Wild West race among a dozen private AI developers where coordination and compromise would be not just difficult but potentially impossible. Of course, if we did decide it was best for governments to take AI arms races seriously, this would also encourage private developers to step on the gas pedal. That said, once governments do recognize the problem, they may be able to impose moratoria on private development. How concerned should we be about accidentally accelerating arms races by talking about them? My gut feeling is it's not too risky, because It's hard to contain the basic idea. Super-powerful AI is already well known not just by governments but even in popular movies. Developing verification measures, technology restrictions, and so on require governments knowing what technology they're dealing with. If governments can think about these issues ahead of time (decades before strong AI becomes feasible), they're more likely to go for cooperation and less likely to panic and build up their own defenses, because they see that there's time for negotiations to potentially work before losing that much ground. Right now most AI research appears to be done in public, so there's not a huge cost for a given country in delaying at this point. Most risk analysts don't express concerns like these too much when talking about military arms races. Of course, there's selection bias; maybe most of the military does think it's dangerous to talk about these issues in public, and we only hear form the minority that defects from this view. But I've never heard criticism against people who talk too much about arms races in public, except this one comment from my friend. Talking about arms-race scenarios specifically makes it much more clear why we need global governance and improved cooperation. It's more persuasive than just saying, "Wouldn't it be great if the world could sing Kumbaya?" That said, I remain open to being persuaded otherwise, and it seems important to think more carefully about how careful to be here. The good news is that the information hazards are unlikely to be disastrous, because all of this material is already publicly available somewhere. In other words, the upsides and downsides of making a bad judgment seem roughly on the same order of magnitude. 8. How do our prospects look? In Technological change and nuclear arms control (1986), Ted Greenwood suggests that arms control has historically had little counterfactual impact: In no case has an agreement inhibited technological change that the United States both actually wanted to pursue at the time of agreement and was capable of pursuing during the intended duration of the agreement. Only in one area of technological innovation (i.e., SALT II constraints on the number of multiple independently-targetable reentry vehicles, or MIRVs, on existing missiles) is it possible that such agreements actually inhibited Soviet programs, although in another (test of new light ICBMs [intercontinental ballistic missiles]) their program is claimed by the United States to violate the SALT II Treaty that the Soviets have stated they will not undercut. In "Why Military Technology Is Difficult to Restrain" (1987), Greenwood adds that the INF Treaty was arguably more significant, but it still didn't stop technological development, just a particular application of known technology. In other domains we also see competition prevail over cooperation, such as in most markets, where usually there are at least several companies vying for customers. Of course, this is partly by social design, because we have anti-trust laws. Competition in business makes companies worse off while making consumers better off. Likewise, competition to build a quick, hacky AI makes human nations worse off while perhaps making the unsafe AIs better off. If we care some about the unsafe AIs for their own sakes as intelligent preference-satisfying agents, then this is less of a loss than it at first appears, but it still seems like there's room to expand the pie, and reduce suffering, if everyone takes things more slowly. Maybe the best hope comes from the possibility of global unification. There is just one US government, with a monopoly on military development. If instead we had just one world government with a similar monopoly, arms races would not be necessary. Nationalism has been a potent force for gluing countries together and if channeled into internationalism, perhaps it could help to bind together a unified globe. Of course, we shouldn't place all our hopes on a world government and need to prepare for arms-control mechanisms that can also work with the present-day nation-state paradigm. 9. Robot arms races **Robots require AI that contains clear goal systems and** an **ability to act effectively** in the world. **Thus,** they seem like a reasonable candidate for where artificial general intelligence will first emerge. Facebook's image-classification algorithms and Google's search algorithms don't need general intelligence, with many human-like cognitive faculties, as much as a smart robot does. **Military robotics seems** like **one of the most likely reasons that** a robot **arms race might develop**. Indeed, to some degree **there's already an arms race to build drones and autonomous weapons** systems. Mark Gubrud: Killer robots are not the only element of the global technological arms race, but they are currently the most salient, rapidly-advancing and fateful. If we continue to allow global security policies to be driven by advancing technology, then **the arms race** will continue, and it **may** even **reheat to Cold War levels, with multiple players** this time. Robotic armed forces controlled by AI systems too complex for anyone to understand will be set in confrontation with each other, and sooner or later, our luck will run out.

AI arms race causes extinction, outweighs nuclear war, and turns other moral theories.

**Shulman and Armstrong 11** write[[8]](#footnote-8)

II. **An AI arms race may be “winner-take-all”** The threat of an AI arms race does not appear to be primarily about the direct application of AI to warfare. While automated combat systems such as drone aircraft have taken on greatly increased roles in recent years (Singer, 2009; Arkin, 2009), they do not greatly disrupt the balance of power between leading militaries: slightly lagging states can use older weapons, including nuclear weapons, to deter or defend against an edge in drone warfare. Instead, the military impact of an intelligence explosion would seem to lie primarily in the extreme acceleration in the development of new capabilities. **A state might launch an AI Manhattan Project to gain** a few months or **years of sole access** to advanced AI systems**, and then initiate an intelligence explosion** to greatly increase the rate of progress. Even if rivals remain only a few months behind chronologically, they may therefore be left many technological generations behind until their own intelligence explosions. It is much more probable that such a large gap would allow the leading power to safely disarm its nuclear-armed rivals than that any specific technological generation will provide a decisive advantage over the one immediately preceding it. If states do take AI potential seriously, how likely is it that a government's “in-house” systems will reach the the point of an intelligence explosion months or years before competitors? Historically, there were substantial delays between the the first five nuclear powers tested bombs in 1945, 1949. 1952, 1960, and 1964. The Soviet Union's 1949 test benefited from extensive espionage and infiltration of the Manhattan Project, and Britain's 1952 test reflected formal joint participation in the Manhattan Project. If the speedup in progress delivered by an intelligence explosion were large, such gaps would allow the leading power to solidify a monopoly on the technology and military power, at much lower cost in resources and loss of life than would have been required for the United States to maintain its nuclear monopoly of 1945-1949. **To the extent that states distrust their rivals with** such **complete power**, or wish to exploit it themselves, **there would be strong incentives to vigorously push forward AI research**, and to ensure government control over systems capable of producing an intelligence explosion. In this paper we will discuss factors affecting the feasibility of such a localized intelligence explosion, particularly the balance between internal rates of growth and the diffusion of or exchange of technology, and consider historical analogs including the effects of the Industrial Revolution on military power and nuclear weapons. III. Accidental risks and negative externalities A second critical difference between the nuclear and AI cases is in the expected danger of development, as opposed to deployment and use. Manhattan Project scientists did consider the possibility that a nuclear test would unleash a self-sustaining chain reaction in the atmosphere and destroy all human life, conducting informal calculations at the time suggesting that this was extremely improbable. A more formal process conducted after the tests confirmed the earlier analysis (Konopinski, Marvin, & Teller, 1946), although it would not have provided any protection had matters been otherwise. The historical record thus tells us relatively little about the willingness of military and civilian leaders to forsake or delay a decisive military advantage to avert larger risks of global catastrophe. In contrast, **numerous scholars have argued that advanced AI poses a nontrivial risk of** catastrophic outcomes, including **human extinction.** (Bostrom, 2002; Chalmers, 2010; Friedman, 2008; Hall, 2007; Kurzweil, 2005; Moravec, 1999; Posner, 2004; Rees, 2004; Yudkowsky, 2008). Setting aside anthropomorphic presumptions of rebelliousness, a more rigorous argument (Omohundro, 2007) relies on the instrumental value of such behavior for entities with a wide variety of goals that are easier to achieve with more resources and with adequate defense against attack. Many decision algorithms could thus appear benevolent when in weak positions during safety testing, only to cause great harm when in more powerful positions, e.g. after extensive self-improvement. Given abundant time and centralized careful efforts to ensure safety, it seems very probable that these risks could be avoided: development paths that seemed to pose a high risk of catastrophe could be relinquished in favor of safer ones. However, the context of an arms race might not permit such caution. A risk of **accidental AI disaster would threaten all of humanity**, while the benefits of being first to develop AI would be concentrated, creating a collective action problem insofar as tradeoffs between speed and safety existed. A first-pass analysis suggests a number of such tradeoffs. Providing more computing power would allow AIs to either operate at superhumanly fast timescales or to proliferate very numerous copies. Doing so would greatly accelerate progress, but also render it infeasible for humans to engage in detailed supervision of AI activities. To make decisions on such timescales AI systems would require decision algorithms with very general applicability, making it harder to predict and constrain their behavior. Even obviously **risky systems might be embraced for competitive advantage**, and the powers with the most optimistic estimates or cavalier attitudes regarding risk would be more likely to take the lead. IV. Barriers to AI arms control Could an AI arms race be regulated using international agreements similar to those governing nuclear technology? In some ways, there are much stronger reasons for agreement: the stability of **nuclear deterrence, and** the **protection afforded by existing nuclear powers to their allies, mean that** the **increased threat of a new nuclear power is not overwhelming**. No nuclear weapons have been detonated in anger since 1945. **In contrast,** simply **developing AI capable of producing an intelligence explosion puts all states at risk** from the effects of accidental catastrophe, or the military dominance engendered by a localized intelligence explosion. However, AI is a dual-use technology, with incremental advances in the field offering enormous economic and humanitarian gains that far outweigh near-term drawbacks. Restricting these benefits to reduce the risks of a distant, novel, and unpredictable advance would be very politically challenging. Superhumanly intelligent AI promises even greater rewards: advances in technology that could vastly improve human health, wealth, and welfare while addressing other risks such as climate change. Efforts to outright ban or relinquish AI technology would seem to require strong evidence of very high near-term risks. However, agreements might prove highly beneficial if they could avert an arms race and allow for more controlled AI development with more rigorous safety measures, and sharing of the benefits among all powers. Such an agreement would face increased problems of verification and enforcement. Where nuclear weapons require rare radioactive materials, large specialized equipment, and other easily identifiable inputs, AI research can proceed with only skilled researchers and computing hardware. Verification of an agreement would require incredibly intrusive monitoring of scientific personnel and computers throughout the territory of participating states. Further, while violations of nuclear arms control agreements can be punished after the fact, a covert intelligence explosion could allow a treaty violator to withstand later sanctions. These additional challenges might be addressed in light of the increased benefits of agreement, but might also become tractable thanks to early AI systems. If those systems do not themselves cause catastrophe but do provide a decisive advantage to some powers, they might be used to enforce safety regulations thereafter, providing a chance to “go slow” on subsequent steps. V. Game-theoretic model of an AI arms race In the full paper, we present a simple game-theoretic model of a risky AI arms race. In this model, the risk of accidental catastrophe depends on the number of competitors, the magnitude of random noise in development times, the exchange rate between risk and development speed, and the strength of preferences for developing safe AI first. VI. Ethical implications and responses The above analysis highlights two important possible consequences of advanced AI: a disruptive change in international power relations and a risk of inadvertent disaster. From an ethical point of view, the accidental risk deserves special attention since it threatens human extinction, not only killing current people but also denying future generations existence. (Matheny, 2007; Bostrom, 2003). **While AI systems would outlive humanity, AI systems might lack key features contributing to moral value, such as** individual **identities, play, love, and happiness** (Bostrom, 2005; Yudkowsky, 2008). Extinction risk is a distinctive feature of AI risks: **even a catastrophic nuclear war or** engineered **pandemic that killed billions would still likely allow survivors** to eventually rebuild human civilization**, while AIs killing billions would likely not** leave survivors. (Sandberg & Bostrom, 2008). However, a national monopoly on an AI intelligence explosion could also have permanent consequences if it was used to stably establish its position. Permanent totalitarianism is one possibility (Caplan, 2008). We conclude by discussing some possible avenues for reducing these long-term risks.

## Contention 2 is Warming

The PP is key to solve warming – overcomes cognitive biases which kill reform.

**Dana 9** writes[[9]](#footnote-9)

Critics of the PP have argued that it is indeterminate and hence basically useless because it can never reveal how much precaution is due in a given case. But many principles and practices are indeterminate in their precise results and policy implications.23 As long as invocation of the PP will draw more attention to huge costs associated with highly uncertain but terrible scenarios, and as long as we believe that heuristic biases will otherwise cause too little attention to be paid to those scenarios, invocation of the PP in the climate change context helpful in producing a more balanced discourse — whatever the ultimate policy choices. Invocation of **the PP, by itself, may be enough to balance** the **policy discourse on climate change**, even if policymakers continue to use traditional quantified CBA, and just include a numerical probability for catastrophic climate change in the absence of regulatory action and a numerical estimate of the expected costs of such catastrophic change. The PP can serve as a means of framing the quantitative CBAs as only a partial and potentially misleading picture of the danger of choosing regulatory inaction. **A** more aggressive but nonetheless **justifiable deployment** of the PP **would be to use it as part of the rationale for not quantifying** the **probability and expected costs of catastrophic scenarios.** This refusal to quantify could be scientifically justified given how little we know about the real probability distribution of catastrophic scenarios.24 **It would** also **counteract the tendency to overweigh** the **certain costs of prevention** and mitigation**, and** to excessively discount or **ignore** the **future costs from** regulatory **inaction**. Why would leaving open-ended (and hence ambiguous) the probability of catastrophic climate change scenarios be likely to result in a relatively heavier weighing of the uncertain costs than would probably occur if some sort of numerical probability distribution were assigned to catastrophic scenarios? From a pure rational choice perspective, perhaps it should not occur. The **psychological lit**erature nevertheless **suggests that** while people are risk-seeking in the avoidance of certain losses as against the avoidance of possible losses when there is numerical probability or probability distribution for the possible losses, people are risk-seeking in the avoidance of truly ambiguous possible losses —that is, losses that are so uncertain that no numerical estimate of the probability or probability distribution of their occurrence is available. Although there is disagreement regarding the definition of "ambiguity" and "ambiguity aversion," the basic idea is that ambiguity is "an intermediate state between ignorance (i.e., complete lack of knowledge) and risk (in which a probability distribution is specified)",25 and that **people are more averse to an ambiguous bet than** to **a quantified risk of loss**. The depth and robustness of the phenomenon of ambiguity aversion is, to be sure, a matter of debate,26 as is the robustness of the tendency for risk-seeking in the avoidance of certain losses. But if people are "irrationally" risk-seeking in avoiding both certain losses and ambiguous losses, then a decision framed as a choice between the avoidance of a certain loss on the one hand and the avoidance of an ambiguous loss on the other may be one where irrational biases cancel out where there is no departure from what rational choice theory would dictate.27 In other words, **where the choice**s **[is] between** the **certain losses** entailed **in prevention** and mitigation efforts **and** the **ambiguous losses** associated **with catastrophic scenarios, heuristic biases may**, on net, **not distort** the **decision-making.**

Warming causes extinction. **Flournoy 12** writes[[10]](#footnote-10)

In the Online Journal of Space Communication , Dr. Feng Hsu, a  NASA scientist at Goddard Space Flight Center, a research center in the forefront of science of space and Earth, writes, “The evidence of global warming is alarming,” noting the **potential for** a **catastrophic** planetary **climate change is real** and troubling (Hsu 2010 ) . Hsu and his NASA colleagues were engaged in monitoring and analyzing climate changes on a global scale, through which they received first-hand scientific information and data relating to global warming issues, including the dynamics of polar ice cap melting. After discussing this research with colleagues who were world experts on the subject, he wrote: I now have no doubt global temperatures are rising, and that global warming is a serious problem confronting all of humanity. No matter whether these trends are due to human interference or to the cosmic cycling of our solar system, there are two basic facts that are crystal clear: (a) **there is overwhelming scientific evidence showing positive correlations between** the level of **CO2** concentrations in Earth’s atmosphere **with respect to** the historical fluctuations of **global temperature changes**; and (b) **the overwhelming majority of the** world’s **scientific community is in agreement about** the **risks of** a potential **catastrophic** global **climate change**. That is, if we humans continue to ignore this problem and do nothing, if we continue dumping huge quantities of greenhouse gases into Earth’s biosphere, humanity will be at dire risk (Hsu 2010 ) . As a technology risk assessment expert, Hsu says he can show with some confidence that the planet will face more risk doing nothing to curb its fossil-based energy addictions than it will in making a fundamental shift in its energy supply. “This,” he writes, “is because **the risks of** a **catastrophic anthropogenic climate change can be** potentially **the extinction of human species**, a risk that is simply too high for us to take any chances” (Hsu 2010 ).

Adopt a parliamentary model to account for moral uncertainty. This entails minimizing existential risks. **Bostrom 9** writes[[11]](#footnote-11)

It seems people are overconfident about their moral beliefs.  But **how should one** reason and **act if one** acknowledges that one **is uncertain about morality** – not just applied ethics but fundamental moral issues? if you don't know which moral theory is correct?

It doesn't seem **you can[’t] simply plug your uncertainty into expected utility** decision theory and crank the wheel; **because many** moral **theories** state that you **should not** always **maximize** expected **utility.**

Even if we limit consideration to consequentialist theories, it still is hard to see how to combine them in the standard decision theoretic framework.  For example, suppose you give X% probability to total utilitarianism and (100-X)% to average utilitarianism.  Now an action might add 5 utils to total happiness and decrease average happiness by 2 utils.  (This could happen, e.g. if you create a new happy person that is less happy than the people who already existed.)  Now what do you do, for different values of X?

The problem gets even more complicated if we consider not only consequentialist theories but also deontological theories, contractarian theories, virtue ethics, etc.  We might even throw various meta-ethical theories into the stew: error theory, relativism, etc.

I'm working on a paper on this together with my colleague Toby Ord.  We have some arguments against a few possible "solutions" that we think don't work.  On the positive side we have some tricks that work for a few special cases.  But beyond that, the best **we have managed** so far is **a** kind of **metaphor, which** we don't think is literally and exactly correct, and it is a bit under-determined, but it **seems to get things roughly right** and it might point in the right direction:

**The Parliamentary Model.**  Suppose that you have a set of mutually exclusive moral theories, and that you assign each of these some probability.  Now imagine that **each** of these **theorie**s **gets to send** some number of **delegates to The Parliament**.  The number of delegates each theory gets to send is **proportional to the probability of the theory.**  Then the delegates bargain with one another for support on various issues; and the Parliament reaches a decision by the delegates voting.  What you should do is act according to the decisions of this imaginary Parliament.  (Actually, we use an extra trick here: we imagine that the delegates act as if the Parliament's decision were a stochastic variable such that the probability of the Parliament taking action A is proportional to the fraction of votes for A.  This has the effect of eliminating the artificial 50% threshold that otherwise gives a majority bloc absolute power.  Yet – unbeknownst to the delegates – the Parliament always takes whatever action got the most votes: this way we avoid paying the cost of the randomization!)

The idea here is that moral theories get more influence the more probable they are; yet **even a** relatively **weak theory can still get its way on some issues** that the theory think are extremely important **by sacrificing** its influence **on other** i**s**sues that other theories deem more important.  For example, **suppose you assign 10% probability to** total **util**itarianism and 90% to moral egoism (just to illustrate the principle).  Then **the Parliament** would mostly take actions that maximize egoistic satisfaction; however it **would make some concessions to util**itarianism **on** issues that utilitarianism thinks is especially important.  In this example, the person might donate some portion of their income to **existential risks** research and otherwise live completely selfishly.

I think there might be wisdom in **this model**.  It **avoids the** dangerous and **unstable extremism** that would result **from letting one’s current favorite moral theory completely dictate action**, while still allowing the aggressive pursuit of some non-commonsensical high-leverage strategies so long as they don’t infringe too much on what other major moral theories deem centrally important.

Cost-benefit analysis is feasible. Ignore any util calc indicts. **Hardin 90** writes[[12]](#footnote-12)

**One** of the **cute**r **charge**s **against util**itarianism **is that** it is irrational in the following sense. **If I take the time to calculate** the consequences of various courses of action before me, **then** I will ipso facto have chosen the course of action to take, namely, to sit and calculate, because while I am calculating the other **courses of action will cease to be open to me. It should embarrass philosophers that they have ever taken this** objection **seriously. Parallel considerations in other realms are dismissed** with eminently good sense. Lord Devlin notes, “If the reasonable man ‘worked to rule’ by perusing to the point of comprehension every form he was handed, the commercial and administrative life of the country would creep **to** a standstill.” James March and Herbert Simon **escape** the quandary of **unending calculation** by noting that often we satisfice, **we do not maximize: we stop calculating** and considering **when we find a merely adequate choice** of action. **When**, in principle, **one cannot know what is** the **best** choice, **one can nevertheless be sure that** sitting and **calculating is not the best choice.** But, one may ask, How do you know that another ten minutes of calculation would not have produced a better choice? And one can only answer, You do not. At some point the quarrel begins to sound adolescent. It is ironic that **the point** of the quarrel **is almost never at issue in practice** (as Devlin implies, **we are** almost all **too reasonable** in practice **to bring the world to a standstill**) but only in the principled discussions of academics.

## Theory Preempts

1. Debating about the PP is key to topic education.

**Schettler and Raffensperger 4** write[[13]](#footnote-13)

**Proof is a value-laden concept that integrates** statistics, **empirical observation, inference**, research design **and research** agendas **in**to **a political** and social **context.** This section discusses the uses and misuses of some of the criteria commonly used to establish proof. Strict criteria may be useful for establishing “facts”, but by the time a fact or causal relationship has been established by rigorous standards of proof, considerable avoidable harm may already have occurred. The effects of lead exposure on children’s brain development or asbestos on lung cancer risk are examples. In each case, people were damaged over many decades, long after substantial evidence of serious health effects was established, while lead and asbestos advocates contested epidemiological “proof” of causation. **Guided by the p**recautionary **p**rinciple**, people are** as **concerned with** the weight of the available evidence as they are with establishing facts by **rigorous standards of proof**. The weight of the evidence can guide preventive action, whereas waiting for proof may allow damage to occur. By convention, a considerable amount of consistent evidence is necessary to establish factual “proof” of a cause-and-effect relationship. Traditionally, in a study of the relationship between two variables, a correlation is said to be statistically significant only if the results show the two to be linked, 5. Why is a precautionary approach needed? 71 independent of other factors, with greater than 95% likelihood that the positive results of the study did not occur by chance. But correlation does not establish causation. In epidemiology, a series of additional criteria, for example, those of Hill (1965), are usually added before causation can be claimed. Hill criteria include not only establishment of a statistically significant correlation between two variables but also require that the causal variable precede the effect, a dose–response relationship, elimination of sources of bias and confounding, coherence with other studies and understanding of a plausible biological mechanism. Tobacco smoking, for example, was known to be associated with lung cancer for more than 50 years before a plausible biological mechanism was finally described. At that point, denying that tobacco “causes” cancer became impossible. People’s adherence to conventions or choices among criteria expresses their willingness to make type I or type II errors. A type I error is the mistake of concluding that an association or phenomenon exists when, in truth, it does not. Conversely, a type II error is the mistake of failing to recognize an association or phenomenon when it does exist. Each kind of error has consequences. Type II errors may, for example, lead people to allow a harmful activity to go forward and are the inevitable result of a consistent bias towards avoiding type I errors. Type I errors will result in invalid concerns about a product or activity and may lead to unnecessary restrictions. Establishing type I and type II error rates is a choice that reflects certain biases and is largely done by convention, often without considering the consequences. For example, by convention, interpretations of scientific data generally favour type II over type I errors. People generally require strong evidence that something is scientifically “true” before being willing to say so. An historical basis for error bias **A general theme that has gained currency** in many countries **is that people** are autonomous individuals who **are free** to live as they wish and **do as they want, provided that they do not cause harm to others.** This concept has set up a tension between the individual and society at large in terms of establishing the limits of tolerance and defining harm. In On Liberty, first published in 1859, John Stuart Mill (1978 (1859)) explored the nature and limits of power that can be legitimately exercised by society over the individual. He concluded that the only purpose for which power can be rightfully exercised over any member of a civilized community, against his or her will, is to prevent harm to others. Mill was concerned that, in a democratic society, the majority would set the limits to tolerance – that the majority would interfere with the creative individual’s inclination to invent and develop and to explore new frontiers. He also worried that the majority would go so far as to define “harm”, using inappropriate assertions of “harm” as a blockade to progress. In short, he feared the “tyranny of the majority” and their inclination to favour the status quo. **This** tension **is at the heart of many of today’s policy debates.** Not only must harm be defined but **people** also **have to decide how to act** or how to legitimately exercise power **when** the probability of harm (**risk**) **is uncertain**. Though decisions must be based on what is known at the time, **if “proof”** of harm **is required before** limiting an activity or **choosing an alternative**, as Mill would have, **there is a risk of failing to prevent harm**. Seeing how Mill’s fears are reflected in today’s policies in many countries throughout the world is easy. In general, the burden of proof of harm falls on the general public or individuals who assert that another party has injured them. High standards of “proof” add to this burden, even when the weight of the evidence suggests that harm has occurred or is likely. In other words, a **bias towards type II errors** – established by convention in interpreting scientific data – **has** also **crept into** social, political and judicial **policy. Asking whether such a bias is appropriate for preventing harm** or for choosing among optional human activities **is fully legitimate**. Further, it may be legitimately ask how such a bias is likely to influence the ways that human activities alter complex ecological systems that define the world to be left to future generations **– a consideration at the core of sustainability.**

Theoretical discussions must precede specific policy analysis. Analyzing principles is key to real world environmental policy making.

Samuelsson, 2010:

(Environmental Pragmatism and Environmental Philosophy: A Bad Marriage.Winter 2010. Lars Samuelsson, Researcher AT The Department of Historical, Philosophical, And Religious Studies At Umea University)

With regard to the worry expressed by environmental pragmatists that such theoretical discussions in environmental philosophy stand in the way of developing (good) environmental policy, I believe that this worry is highly exaggerated. I think it both (1) overestimates the practical importance of environmental philosophy, and (2) underestimates the practical significance of investigating questions concerning intrinsic value in nature: (a) to think that environmental philosophy has the power of significantly slowing down the environmental movement (or of considerably speeding it up) is to overestimate the importance of environmental philosophy within that movement. Environmental philosophy is but one part of the environmental movement, and I have seen no compelling arguments to the effect that it is such an important part as to have this power. (b) On the other hand, there is at least some evidence that both the environmental movement, and political decision makers, have been influenced by theoretical discussions within environmental ethics, such as those concerning intrinsic value in nature. 26 When Light and Katz take the overriding aim to be “finding workable solutions to environmental problems now,” this is certainly a praiseworthy initiative, and in one respect this aim is indeed an overriding aim, but it should not be the overriding aim of environmental philosophy per se (although it may, of course, be the overriding aim of particular environmental philosophers). The question of whether or not, and in what sense, nature has intrinsic value does not stand in contrast to questions of finding workable solutions to environmental problems. To the contrary, such questions can often go hand in hand. Debates about intrinsic value in nature take place within environmental ethics, while finding workable solutions to environmental problems is a question for the entire environmental movement (indeed, for everyone). The whole field of environmental ethics (as well as the wider field of environmental philosophy) can be seen as a part of this larger environmental movement, within which it has its specific role. While the aim of this larger movement is indeed to find workable solutions to environmental problems, the role of environmental ethics is (among other things) to provide theoretical foundations for these solutions. Environmental ethics interacts with other parts of the environmental movement in various ways, and a lively internal debate within environmental ethics should be seen as a sign of health for the environmental movement at large, indicating both self-criticism and the absence of dogmatism. 27

2. Err aff on theory because of time skew and neg side bias. Negs won 12% more rounds at VBT according to Tabroom, and Fantasy Debate confirms 7% neg side bias. Even if we both get 13 minutes, the distribution of time is the source of the abuse. Getting faster doesn’t solve skew because that option applies equally to both sides.

## Contention 3 is Solvency

The PP is the best middle ground between industry and regulation. **Sachs 11** writes[[14]](#footnote-14)

Critics are overlooking that **the Principle can provide** a workable **accommodation between the needs of industry and** the need to ensure harm prevention and **adherence to ecological limits.** Specifically, **putting government in a** risk **gatekeeping role serves** several **important purposes, including:**  **Ensuring that the applicant** is competent to engage in the activity and **has** the **required expertise and resources;**  **Regulating** the **location of** potentially **risky activities** and ensuring that they occur in places where risks to the public are minimized;  **Ensuring that activities** presenting serious threats to public health or the environment can be prohibited (or **have safety precautions** placed on them) **before harm occurs;**  **Ensuring, through** establishing **a uniform review process** for every applicant**, that the cumulative amount of a risky activity does not exceed limits that would be damaging to the environment** or human health; **and**  **Minimizing risks while further research is conducted and making** that **research the responsibility of firms that will benefit the most** from the activity. I am not trying to defend every permitting and licensing scheme, of course. Government permitting programs can be burdensome and prone to political favoritism and rent-seeking behavior. They are often complex. If inadequately funded and staffed, a governmental review may be no more than a fig leaf of risk management (witness the Deepwater Horizon Oil Spill and the lax oversight of the Minerals Management Service). But the long-standing practice in U.S. law of establishing government agencies as ex ante gatekeepers for risk does suggest that the Strong Precautionary Principle cannot be so easily dismissed. It is not as alien to U.S. law and values as the critics would have us believe, and it hardly seems “paralyzing” in the many contexts in which it has been applied.

General indicts to the PP are irrelevant. **Dana 9** writes[[15]](#footnote-15)

Is the precautionary principle (PP) incoherent and therefore irrational to use as a guide or tool in policymaking? A number of thoughtful scholars have argued as much, and their arguments, on their own terms, make a good deal of sense. These **scholars**, however, **are arguing about the PP** in the abstract, **asking whether it coheres as a matter of abstract logic**, and it may not – indeed it probably does not. **But the PP does make sense in particular, and** very **important, contexts.** Rather than asking whether the PP is rational in general, we should be asking whether or not there are contexts in which it is rational to use the PP as a policy tool. According to one much-cited formulation, the PP means that "[w]hen an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically."1 Different versions of the PP build on the idea of "precautionary measures,” and what this actually means or encompasses. In its strong forms, the PP prescribes that an activity or product posing a risk to human health or the environment should be flatly prohibited until it is scientifically proven that the activity or product, in fact, will not harm human health or the environment. In its weak forms, the PP can take 1 “Wingspread Statement on the Precautionary Principle” (1998), online: <www.gdrc.org/u-gov/precaution- 3.html>. 2 the form of a mere cautious attitude, democratic inclusion, and/or additional efforts at fact-finding, but no particular regulatory prohibitions or restrictions. In academic discourse, the critics of PP tend to emphasize its strong forms, apparently because these forms of PP lead to hard-to-defend results in certain cases. Conversely, academic defenders of PP tend to emphasize its weaker forms, apparently because these forms of PP can be squared with almost any decision and never lead to hard-to-defend results.2 This article defines the PP primarily based on what it is not: it is not quantitative cost-benefit or cost-cost analysis of the sort we associate with the Office of Management and Budget in the United States and U.S. policymaking and policy discourse generally.3 In this definition, the PP is a form of analysis in which the costs of a possible environmental or health risk are not quantified, or if they are, any quantification is likely to be inadequate to capture the full extent of the costs of not taking regulatory measures to mitigate or avoid the risk. So defined, the PP is a more "rational" approach compared to cost-benefit or cost-cost because, in certain contexts, the costs associated with an environmental or health risk will tend to be relatively under-weighed without the application of the PP to account for non-quantifiable risk. After a brief discussion of the rationality and utility of the PP in Part II, this article addresses two important contexts in which it is rational to apply the PP. Part III 2 For a thoughtful overview and treatment of the PP, see Douglass A. Kysar, “It Might Have Been: Risk, Precaution and Opportunity Costs” (2006) 22 J. Land Use & Envtl. L. 1. For a discussion of the definitional issues surrounding the PP, see David A. Dana, “A Behavioral Economic Defense of the Precautionary Principle” (2003) 97 Nw. U. L. Rev. 1315. . 3 For a good comparative discussion of the PP and CBA, see generally Gregory N. Mandel & James Thuo Gathii, “Cost-Benefit Analysis Versus the Precautionary Principle: Beyond Cass R. Sustein’s Law of Fear” (2006) 2006 U. Ill. L. Rev. 1037. 3 examines climate change, especially as it would affect developed northern hemisphere countries, and Part IV discusses emerging nanotechnology, as it is used in a wide array of consumer products. These **contexts are very different, and so** too **is the contextual justification for the PP. In the context of climate change,** the **heuristic bias** in favour of avoiding certain losses **may lead to an under-weighing of catastrophic scenarios** of climate change, at least in the context of U.S. policymaking. Part III of this article explores how prospect theory (also called loss aversion), ambiguity aversion, cost-benefit analysis (CBA) and the PPT may interact in this context. Part IV discusses the case of emerging technologies, in which the products are developed and marketed by for-profit entities that have strong monetary incentives to explore and document the benefits of the products and much weaker incentives to explore and document any possible adverse environmental or health effects associated with the products. In the CBA framework, regulators tend to weigh known benefits against known costs or at least known risks. So framed, this weighing may pay too little attention to unknown costs and unknown risks that have intentionally not been explored by market actors. In both the cases of climate change and emerging technologies, application of the PP can correct what would otherwise be a tendency to under-weigh the costs of not taking action to prevent or mitigate possible environmental and health risks. The PP can justify directing less attention to “bottom line” quantitative estimates of the costs of unmitigated climate change and more attention to avoiding terrible but highly uncertain 4 climate change scenarios.4 With nanotechnology, the PP can function as a means of focusing less attention on whether or not nanotechnology is harmful or safe given current knowledge and more attention to developing ways to produce more and better knowledge about the risks posed by nanotechnology. **The debate over the PP** versus CBA **has** often **been too abstract** and lacking in context. **A more productive approach would be to** instead **ask** when – **in what contexts** — **does it make sense** to apply the PP and when does it not? This article is an initial contribution to that re-framed debate.

The PP is key to sustainability. **Grant and Quiggin 13** writes[[16]](#footnote-16)

6. Concluding comments Informally stated, **the P**recautionary **P**rinciple **has** strong **intuitive appeal**, particularly in the context of environmental regulation. **In dealing with** complex, **fragile and poorly understood natural systems, it seems to make sense ‘to err on the side of caution.’** However, this way of putting things points out the difficulties in formalizing the Precautionary Principle. ‘To err’ means to commit an error, and it is obviously difficult to include a prescription for error in a formal theory of decision under uncertainty. Yet **decisions are prone to errors arising from** an incomplete understanding of the problem at hand, and of the likelihood that some **contingencies** will **not** be **taken into account**. It seems desirable to take account of this reality in formulating a procedure for making decisions. In this paper, we have addressed the question in relation to the standard Bayesian model of decision theory, developed in the framework of an extensive-form game. We have argued that the Precautionary Principle is best understood, not as a modification of Bayesian decision theory, but rather as a heuristic constraint on the application of that theory; that is, as a response to the recognition that the outcomes of decisions may be affected by unforeseen contingencies. Heuristic constraints such as the Precautionary Principle must be satisfied before it is appropriate to apply the tools of Bayesian decision theory. **The P**recautionary **P**rinciple **is most commonly applied in relation to** interactive decisions, involving judgments as to whether or not to proceed with projects or innovations that may pose **unforeseen risks**. In this context, **the P**recautionary **P**rinciple may be regarded as a procedural rule that **places** the **burden of proof on proponents of activities subject to poorly-understood risks**. Under the Precautionary Principle, **proponents must convince policy makers** not only **that** the **expected benefits exceed** the **expected costs but also that the project will not be subject to** any **significant unanticipated adverse outcomes.**

# 1AR

## AT Must Spec Policy

### I Meet

1. I meet. Implementation of the PP directly mandates court-enforceable risk assessment.

**Wibisana 11**

Andri G Wibisana (Lecturer of the Law Faculty of Universitas Indonesia). “The Development of the Precautionary Principle in International and in Indonesian Environmental Law.” Asia Pacific Journal of Environmental Law, Vol. 14(1 & 2), 2011. http://papers.ssrn.com/sol3/papers.cfm?abstract\_id=2131666

Early **experience of implementing the p**recautionary **p**rinciple in Indonesia **illustrates that the principle is manifested in the obligation to conduct risk assessment. This** type of **implentation** of the precautionary principle **can be clearly seen in the decisions of** District and High Administrative **Courts** on the Kapas Transgenik case and in Government Regulation No 21 of 2005.

2. I meet. The Precautionary Principle is implementable based on specific policy guidelines; that’s Collins 5.

This also proves his interp isn’t necessary. I don’t need to specify a country or a resource for him to have ground.

### Counter-Interp

Counter-Interp – The aff may defend the precautionary principle, i.e. my plan.

1. The PP lit is not about specific policies. Debating the PP is key to topic education, that’s Schettler and Raffensperger 4. Topic education outweighs – that’s Samuelsson 10. Ecological ethics is key to effective environmental policy.

2. Predictable limits. Specific policies blow the lid off the topic. There are infinite solvency mechanisms for EP and this topic is already very broad. General principle means negs get stock ground regardless of the aff. Predictable limits control the link to fairness and education because it’s key to pre-round prep.

3. I’m most textual. **Nebel 14** writes[[17]](#footnote-17)

I hear that many affirmatives on this topic defend the implementation of a particular policy or set of policies in developing countries. The classic framing of this issue has been in terms of an Aims vs. Implementation dichotomy, which has carried over from the Jan/Feb 2013 topic about valuing rehabilitation above retribution. In this article, I’ll explain why I think that is a false dichotomy, and how you can strategically get past this framing of the issue. The most important word in the resolution, for the purposes of this disagreement, is ‘prioritize.’ This is because a topical affirmative advocacy has to do the thing that the resolution says ought to be done. In this case, that’s prioritization. Now, if you just stop there, you might have the following thought: if a topical advocacy just needs to prioritize environmental protection (EP) over resource extraction (RE), then implementing some particular policy that prioritizes EP over RE is, ceteris paribus, topical. But that’s not a good inference. The reason is that what has to do the prioritizing in order to be topical is the agent. Your advocacy must be that the agent prioritize EP over RE, whatever that means. In this case, that agent is ‘developing countries.’ **Just because an agent implements some policy** or set of policies that prioritize EP over RE **does not mean that the agent** itself **prioritizes EP over RE**. This may seem like a picky distinction, but consider some examples. **Suppose I chose to spend time with my friends tonight, rather than work on a paper**. This choice might prioritize friendship over work. But this choice does not make it the case that I prioritize friendship over work. **I might actually** be the kind of person who **prioritize**s **work over friendship, so that I almost always choose to write a paper** when I could instead hang out with friends**, but this** night **is the rare opportunity when I hang out with my friends**. So, just because some choice or action prioritizes one thing over another does not entail that the agent prioritizes one thing over another. If we assume that an advocacy is topical only if it makes it the case that the agent does what the resolution says it ought to do, then this means that implementing a particular policy that prioritizes EP over RE is not enough to be topical. (That is, absent evidence about this policy having the effect of changing developing countries’ priorities as a whole. But then this advocacy might only be effects-topical.) People might respond with a definition of EP or RE in terms of policies. This definition might show that the objects to be prioritized are sets of policies, or some common feature of policies, rather than an abstract aim. But the relevant question is not Aims vs. Implementation: that framing of the topic only persists because of Jan/Feb 2013, on which people defined 'rehabilitation' and 'retribution' as either an aim or a kind of policy. But Aims vs. Implementation is not the correct contrast. The correct contrasts are Aims vs. Policies, and Prioritization vs. Implementation. The point is that prioritizing some kind of policy is not the same as implementing some policy from that set. Aims vs. Policies is a matter of the direct object, whereas Prioritization vs. Implementation is a matter of the verb. **We can agree that EP and RE are sets** or kinds **of policies, but** think **that the resolution is about which we ought to prioritize, not** which we ought to **implement**. However, this does not mean that the anti-policy side completely wins. People who wish to defend an anti-policy interpretation often make their interpretations too strong, by **suggesting** that **no questions of implementation are relevant**. That **seems** to me **false**. To see why, consider a variation on my earlier example about hanging out with my friends or writing a paper. Suppose I used to prioritize work over friendship, but I now prioritize friendship over work. It seems that I am now more likely to spend time with my friends, when this trades off with writing a paper, than I used to be. This is because **an agent’s priorities shape her decisions**. They don’t guarantee that an agent will always choose any particular action that better reflects those priorities. But they will lead to different patterns of actions on the whole. If this is right, then **the most accurate Aims-based interp**retation of the topic **allows that the aff**irmative **advocacy leads to** the **implementation of policies that prioritize EP over RE as an effect**, although the affirmative can’t advocate any particular policy. Implementation of particular policies is an effect, which can be used to garner advantages or disadvantages, but cannot be the affirmative advocacy. And any particular effect of that kind can only be known with some uncertain probability; it cannot be assumed to occur as a matter of fiat.

Textuality controls the link to predictability and ground. Prefer topic analysis to single words because the whole sentence determines a word’s context.

### AT Ground

1. There’s tons of topic lit about general principles. Not my fault you didn’t cut it.

2. My advocacy text is pretty much the topic. If he couldn’t predict that he should have disads to the topic, that’s not my fault.

3. Even if policies differ, there are still general advantages and disadvantages as proven by all my contentions.

4. Limits turn ground. There’s no way he’d have answers to the Balochistan chromite aff.

### Reasonability

Gutcheck against dumb theory. Competing interps leads to a race to the bottom where every round comes down to theory, killing substantive education. Intervention is inevitable in blippy theory debates.

### RVIs Frontlines

Omitted

1. Cummiskey, David. Associate professor of philosophy at the University of Chicago. “Kantian Consequentiaism.” Ethics 100 (April 1990), University of Chicago. <http://www.jstor.org/stable/2381810> [↑](#footnote-ref-1)
2. Stephen Luntz (staff writer). Citing Safa Motesharrei, graduate student in mathematics at the National Socio-Environmental Synthesis Center. “According to a NASA Funding Study, We’re Pretty Much Screwed.” I Fucking Love Science. March 19th, 2014. http://www.iflscience.com/environment/according-nasa-funded-study-were-pretty-much-screwed#cWych02cH9mk6Tm6.16 [↑](#footnote-ref-2)
3. William CALVIN, theoretical neurophysiologist at the University of Washington, Atlantic Monthly, January, The Great Climate Flip-Flop, Vol 281, No. 1, 1998, p. 47-64 [↑](#footnote-ref-3)
4. Dr. Glen Barry 13, Political ecologist with expert proficiencies in old forest protection, climate change, and environmental sustainability policy, Ph.D. in "Land Resources" and Masters of Science in "Conservation Biology and Sustainable Development” from the University of Wisconsin-Madison, “ECOLOGY SCIENCE: Terrestrial Ecosystem Loss and Biosphere Collapse,” Forests.org, February 4, 2013, pg. http://forests.org/blog/2013/02/ecology-science-terrestrial-ec.asp [↑](#footnote-ref-4)
5. Emeka Polycarp Amechi (PhD (Wits). Barrister and Solicitor of the Supreme Court of Nigeria). ‘Linking Environmental Protection and Poverty Reduction in Africa: An Analysis of the Regional Legal Responses to Environmental Protection’, 6/2 *Law, Environment and Development Journal* (2010), p. 112. http://www.lead-journal.org/content/10112.pdf [↑](#footnote-ref-5)
6. Brian Tomasik (“I work on researching the best ways to reduce suffering in the future, examining crucial considerations in science, politics, sociology, and philosophy that bear on this topic. You can read more on my website: Essays On Reducing Suffering. I graduated from Swarthmore College in 2009, where I studied computer science, mathematics, statistics, and economics. I wrote a thesis on multitask feature selection and published additional papers on machine learning and international trade. From 2009-2013, I worked in the relevance division of Bing at Microsoft, improving ranking algorithms for web results through feature engineering, data mining, and architectural innovation. I built end-to-end three of Bing's production ranking models, which served over 5 billion searches on Bing and Yahoo every month.”). “Crop Cultivation and Wild Animals.” Essays on Reducing Suffering. 2008-2013, Last update: December 12th, 2013. http://www.utilitarian-essays.com/crop-cultivation-and-wild-animals.html [↑](#footnote-ref-6)
7. Brian Tomasik (graduated from Swarthmore, former programmer at Bing). “International Cooperation vs. AI Arms Race.” Last updated April 3rd, 2014. http://utilitarian-essays.com/ai-arms-race.html#section7 [↑](#footnote-ref-7)
8. Carl Shulman (Singularity Institute of Artificial Intelligence) and Stuart Armstrong (InhibOx, an organization dedicated to developing and delivering the best services and technologies in computer-aided drug discovery ). “Singularity Hypotheses: A Scientific and Philosophical Assessment.” April 13th, 2011. http://singularityhypothesis.blogspot.com/2011/04/arms-races-and-intelligence-explosions.html [↑](#footnote-ref-8)
9. David Dana (Northwestern University School of Law). “The Contextual Rationality of the Precautionary Principle.” Faculty Working Paper. 2009. [↑](#footnote-ref-9)
10. Don Flournoy 12, Citing Feng Hsu, PhD NASA Scientist @ the Goddard Space Flight Center and Don is a PhD and MA from UT, former Dean of the University College @ Ohio University, former Associate Dean at SUNY and Case Institute of Technology, Former Manager for University/Industry Experiments for the NASA ACTS Satellite, currently Professor of Telecommunications @ Scripps College of Communications, Ohio University, “Solar Power Satellites,” January 2012, Springer Briefs in Space Development, p. 10-11 [↑](#footnote-ref-10)
11. Bostrom, Nick (*Existential*ist of a different sort). “Moral uncertainty – toward a solution?” 1 January 2009. <http://www.overcomingbias.com/2009/01/moral-uncertainty-towards-a-solution.html> [↑](#footnote-ref-11)
12. Hardin, Russell (Helen Gould Shepard Professor in the Social Sciences @ NYU). May 1990. Morality within the Limits of Reason. University Of Chicago Press. pp. 4. ISBN 978-0226316208. [↑](#footnote-ref-12)
13. Ted Schettler (SEHN's Science Director, received his MD from Case-Western Reserve University and a masters degree in public health from the Harvard School of Public Health. He practiced medicine for many years in New England.Ted has worked extensively with community groups and non-governmental organizations throughout the US and internationally, addressing many aspects of human health and the environment. He has served on advisory committees of the US EPA and National Academy of Sciences.) and Carolyn Raffensperger (executive director of the Science and Environmental Health Network. In 1982 she left a career as an archaeologist in the desert Southwest to join the environmental movement. She first worked for the Sierra Club where she addressed an array of environmental issues, including forest management, river protection, pesticide pollutants, and disposal of radioactive waste. She began working for SEHN in December 1994. As an environmental lawyer she specializes in the fundamental changes in law and policy necessary for the protection and restoration of public health and the environment). “Why is a precautionary approach needed?” The precautionary principle: protecting public health, the environment and the future of our children. WHO. 2004. http://www.euro.who.int/\_\_data/assets/pdf\_file/0003/91173/E83079.pdf [↑](#footnote-ref-13)
14. Noah Sachs (Associate Professor, University of Richmond School of Law and Director, Robert R. Merhige, Jr. Center for Environmental Studies). “Rescuing the Strong Precautionary Principle from its Critics.” U of Illinois Law Review. 1 August 2011. [↑](#footnote-ref-14)
15. David Dana (Northwestern University School of Law). “The Contextual Rationality of the Precautionary Principle.” Faculty Working Paper. 2009. [↑](#footnote-ref-15)
16. Simon Grant and John Quiggin (University of Queensland, School of Economics). “Bounded awareness, heuristics, and the Precautionary Principle.” Journal of Economic Behavior and Organization. July 17th, 2013. [↑](#footnote-ref-16)
17. Jake Nebel (TOC semifinalist in 2009, philosophy student at Oxford, winner of the Marshall Scholarship from Princeton University). “Topicality, Implementation, and What We Ought To Prioritize.” January 28th, 2014. http://victorybriefs.com/vbd/2014/1/topicality-implementation-and-what-we-ought-to-prioritize [↑](#footnote-ref-17)