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# The Status of the climate after COVID-19: using ethics to overcome scientific uncertainty

**Hind A. Al-Abadleh and Stephen F. Haller**

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As pandemic restrictions ease, will we try to maintain our current lifestyles and familiar economic policies? Or, will we rise to the challenge of our time and meet the responsibility of doing things differently, to address socio-economic inequities and environmental calamities? This paper addresses these questions by proposing an evidence and values-based framework rooted in the science and philosophy of environmental changes, as exacerbated by global climate change.

The COVID-19 pandemic has highlighted the essentialness of our natural world to social, economic, and political systems. On the one hand, it has exposed the inequalities in our economic<sup>1</sup>, health care<sup>2</sup>, and educational systems.<sup>3</sup> On the other hand, global lockdowns and COVID-19 restrictions on mobility, travel, and social gatherings, have incidentally created short-term improvements in air quality<sup>4</sup>, reductions in carbon dioxide levels<sup>5</sup>, reductions in noise levels<sup>6</sup>, and an increased mobility of wildlife.<sup>7</sup> Many scholars, therefore, regard this health crisis as an opportunity to make transformative changes in the way we live. However, because of the mixed negative and positive impacts that different social and economic sectors have experienced, unanticipated effects of responses to COVID-19 raise important questions as most countries are gradually lifting pandemic-related restrictions: How will we respond to the situation we are in today? Will we pretend that things are fine, and that we can return to the way we lived before the pandemic? Will we try to maintain our current lifestyles and familiar economic policies? Or, will we rise to the challenge of our time and meet the responsibility of doing things differently, to address socio-economic inequities and environmental calamities?

This paper addresses these questions by proposing an evidence and values-based framework rooted in the science and philosophy of environmental changes, as exacerbated by global climate change. In the first half of the paper, scientific evidence is presented on the current status of the Earth's climate, and the path that we as a species must now have to take so as to achieve net-zero carbon emissions by 2050 in a post COVID-19 world. This path is one that is opened, or hinted at, due to COVID-19 and the alterations in our lifestyle it has forced us to make. In the second half of the paper, an argument is made for adopting a precautionary stance based on the distinction between *Reasons-for-belief* and *Reasons-for-action*. In summary, it is possible to have good reasons for *action* despite the *lack of certainty* about the facts, and vice-versa. To illustrate the stakes involved, an analogy is presented between what existentialist philosopher Karl Jaspers described as “border” (or “limit”) situations; and the similar situation today concerning making decisions under uncertainty and great risk. We believe that the COVID-19 pandemic constitutes a “border situation.” The stakes are high, and many are tempted to delay significant precautionary action, so as to return to business-as-usual as quickly as possible. We argue that, while scientific considerations are paramount to belief, it is ethical considerations that should also frame our decision making when reacting to the pandemic.

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<sup>1</sup> Stiglitz, J., Conquering the Great Divide. *IMF Finance and Development* 2020,

<https://www.imf.org/external/pubs/ft/fandd/2020/09/pdf/COVID19-and-global-inequality-joseph-stiglitz.pdf>

<sup>2</sup> Jensen, N.; Kelly, A. H.; Avendano, M., The COVID-19 Pandemic Underscores the Need for an Equity-Focused Global Health Agenda. *Humanit. Soc. Sci. Commun.* 2021, 8 (15), <https://doi.org/10.1057/s41599-020-00700-x>

<sup>3</sup> Torn Safety Nets: How COVID-19 has Exposed Huge Inequalities in Global Education by The World Economic Forum. <https://www.weforum.org/agenda/2020/06/torn-safety-nets-shocks-to-schooling-in-developing-countries-during-coronavirus-crisis/>

<sup>4</sup> Venter, Z. S.; Aunan, K.; Chowdhury, S.; Lelieveld, J., COVID-19 Lockdowns Cause Global Air Pollution Declines. *Proc. Nat. Acad. Sci. USA* 2020, 117 (32), 18984-18990.

<sup>5</sup> Le Quere, C., Temporary Reduction in Daily Global CO<sub>2</sub> Emissions During the COVID-19 Forced Confinement. *Nature Climate Change* 2020, 10 647-653.

<sup>6</sup> Caniato, M.; Bettarello, F.; Gasparella, A., Indoor and Outdoor Noise Changes due to the COVID-19 Lockdown and their Effects on Individuals' Expectations and Preferences. *Sci. Rep.* 2021, 11 (16533), 1-17 (<https://doi.org/10.1038/s41598-021-96098-w>).

<sup>7</sup> Rutz, C.; Loretto, M. C.; Bates, A. E.; et al., COVID-19 Lockdown Allows Researchers to Quantify the Effects of Human Activity on Wildlife. *Nat. Ecol. Evol.* 2020, 4 1156-1159.

This is an interdisciplinary paper that acknowledges the limitations of the physical sciences and applied ethics fields in addressing a global crisis like climate change. It aims to draw timely insights to instill optimism and motivate action, despite knowledge limitations. These insights were used to articulate the main conclusion of the paper, which is a framework for seizing the generational opportunity we now have; to build more resilient, equitable, and greener communities and economies that acknowledge our planet's natural boundaries and limitations, and flourish within them.

## State of climate change science and impacts

Global climate change is now painfully visible across the Canadian, and global, landscape. In a recent *Balsillie Paper*<sup>8</sup>, Al-Abadleh provides a concise analysis of the underlying science of air pollution, the ozone hole and human-caused climate change. The latter, on its own, has been linked to increasing extinction rates, ocean acidification, rapid melting of ice cover in the poles, and increasing intensity and frequency of forest fires and heat waves. Of direct relevance to the ongoing global COVID-19 pandemic, ecological disturbance and habitat loss (which forces bats and other animals into urban spaces<sup>9</sup>), and the trade in wildlife, are possible causal factors in the predictable emergence of new viruses. It is likely that other corona viruses (e.g. SARS, MERS), emerged in a similar way. In fact, “70 percent of emerging infectious diseases of animal origin come from wildlife”.<sup>10</sup> While the year 2020 tied for the warmest year on record with 2016 per NASA analysis<sup>11</sup>, Siberia, Western Canada and the United States had their first heat wave earlier than usual in 2021, which was followed by ‘heat domes’ lasting for days resulting in the heat-related deaths of hundreds of people and billions of marine life<sup>12,13</sup> and wide-spread wildfires.<sup>14,15</sup>

Climate scientists have predicted for decades that with ‘business as usual’ carbon emissions, the frequency and intensity of heat waves will increase globally. Sadly, scientific data shows that warming and impacts of climate change have been occurring at a much faster rate than predicted.<sup>16</sup> In the context of the latest heat waves, while there is not much we can do to radically and quickly change the course of rising temperatures, coping in a ‘hot world’ means that governments have needed to invest more in adaptation

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<sup>8</sup> Al-Abadleh, H. A., Climate Lessons From the Global Response to COVID-19. *Balsillie Papers* 2021, 3 (6), 1-10.

<sup>9</sup> Editor, To Stop Pandemics, Stop Deforestation. *Scientific American* 2020, (June 2020), 8.

<sup>10</sup> Qiu, J., Chasing Plagues. 2020, *Scientific American* (June 2020), 26-32.

<sup>11</sup> 2020 Tied for Warmest Year on Record, NASA Analysis Shows (accessed february 7, 2021).

<https://www.nasa.gov/press-release/2020-tied-for-warmest-year-on-record-nasa-analysis-shows>

<sup>12</sup> Canadian Inferno: Northern Heat Exceeds Worst-Case Climate Models by Jonathan Watts.

<https://www.theguardian.com/environment/2021/jul/02/canadian-inferno-northern-heat-exceeds-worst-case-climate-models> (accessed July 15, 2021)

<sup>13</sup> ‘Heat Dome’ Probably Killed 1bn Marine Animals on Canada Coast, Experts say.

<https://www.theguardian.com/environment/2021/jul/08/heat-dome-canada-pacific-northwest-animal-deaths>

<sup>14</sup> Deadly British Columbia Heatwave Sows Wildfires Across Canada’s West by Jesse Winter.

<https://www.theguardian.com/world/2021/jul/02/canada-wildfires-british-columbia-heatwave> (accessed July 15, 2021)

<sup>15</sup> Siberia Wildfires: Russia Army Planes and Thousands of Firefighters Battle Blazes.

<https://www.theguardian.com/world/2021/jul/14/siberia-wildfires-russia-army-planes-and-thousands-of-firefighters-battle-blazes> (accessed on July 15, 2021)

<sup>16</sup> *IPCC AR6 Climate Change 2021: The Physical Science Basis*; Cambridge University Press, 2021;

<https://www.ipcc.ch/report/ar6/wg1/>

strategies. For instance, the Netherlands established the Climate Proof Cities (CPC) research program (2010-2014) aimed at “strengthening the adaptive capacity and reducing the vulnerability of the urban system against climate change and [developing] strategies and policy instruments for adapting our cities and buildings”.<sup>17</sup> Operating space, such as climate-controlled or cooled areas, is energy intensive, and hence, transitioning to clean and renewable energy sources and phasing out fossil fuels will not only lower our carbon emissions, but also help people survive heat waves when they occur.

Time is of the essence. The year 2020 was identified by the UN Emissions Gap Report as the year that required aggressive action to lower carbon emissions for a 66% chance of limiting warming below 2 degrees by the end of century.<sup>18</sup> Otherwise, mid-century is also projected as the ‘point of no return’ that poses an existential threat to human civilization as we know it. Therefore, the path to net zero carbon by 2050 in a post COVID-19 world<sup>8</sup> requires making important and difficult social and political decisions locally and globally, today. The key to moving forward is taking political and economic action that focuses on the longer-term sustainability of the natural, social, and economic foundations keeping the basic tenets of our planet and society in place. As presented by Al-Abadleh<sup>8</sup>, political efforts, to date, have aimed to power-up national economies in response to COVID-19 by decoupling economic growth from fossil fuels, using short term investments and stimulus packages in green and clean technology.<sup>19</sup> Still more aggressive action is needed commensurate with the urgency of the climate crisis which recognizes that recovery from the current and future pandemics depends on ecological health, and not simply economic health.<sup>20</sup> When stakes are high, and the science uncertain, there are ethical arguments for taking precautionary action, rather than waiting for more certainty.<sup>21</sup> The following sections elaborate on the ethical dimension in responding to environmental crises when the ultimate knowledge we get from science has elements of uncertainty.

### Decision making in “border situations”

Jane Goodall has said: “It is our disregard for nature and our disrespect of the animals we share the planet with that has caused this pandemic.”<sup>22</sup> The UN Secretary-General, Antonio Guterres tell us that “*Making peace with nature*” is the defining task of the coming decades.<sup>23</sup> These comments are referring to the COVID-19 pandemic and its connection with the degradation of the environment outlined in the above section. This degradation and its effects are no longer a surprising turn of events for us today.

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<sup>17</sup> Overview of Challenges and Achievements in The Climate Adaptation of Cities and in the Climate Proof Cities Program. *Building and Environment* 2015, 83 1-10.

<sup>18</sup> United Nations Environment Program, Emissions Gap Report (accessed February 7, 2021). <https://www.unenvironment.org/resources/emissions-gap-report-2019>

<sup>19</sup> IRENA *The Post-Covid Recovery: An Agenda for Resilience, Development And Equality*, Abu Dhabi, 2020; pp <https://www.irena.org/publications/2020/Jun/Post-COVID-Recovery>.

<sup>20</sup> Editorial, Embed Nature in Strategies to Reboot Economies. *Nature* 2020, 581 119.

<sup>21</sup> Haller, S. F., *Apocalypse soon?* McGill-Queen’s University Press: Montreal & Kingston, Canada, 2002.

<sup>22</sup> Jane Goodall Pandemic video. <https://www.youtube.com/watch?v=cqaoMqrRsaY> (accessed July 15, 2021)

<sup>23</sup> Human Destruction of Nature is ‘Senseless And Suicidal’, warns UN Chief By Carrington, D. <https://www.theguardian.com/environment/2021/feb/18/human-destruction-of-nature-is-senseless-and-suicidal-warns-un-chief> (Accessed Feb 18, 2021)

Rather, the pandemic is a predictable outcome of human actions. D. Quammen writes, “That the virus emerg[ing] from a nonhuman animal, probably a bat, and possibly after passing through another creature, may seem spooky, yet it is utterly unsurprising to scientists who study these things.”<sup>24</sup> His point is that the COVID-19 pandemic was a foreseeable consequence of our actions, and should not be interpreted as merely bad luck or an accident of chance. Rather, it is about the choices we make, or fail to make.

There is a useful analogy that can be made between these choices we now face, and the choices described by existential philosophers under a different context. Philosophers such as Kierkegaard<sup>25</sup> and Sartre<sup>26</sup> emphasize that some choices are existential. That is, they are not merely about efficiency, or facts, or means-ends calculations; but rather, they are choices that determine our very identity, and what kind of persons we choose to be. They are about taking responsibility for a decision, and not merely letting things happen. Existential psychologist and philosopher Karl Jaspers wrote about decisions in what he called “border” (or “limit”) situations. These are the momentous decisions one faces when living outside the boundaries of ordinary existence. Sarah Bakewell describes them as: “Moments when one finds oneself constrained... by what is happening, but at the same time pushed by these events towards the limits or outer edge of normal experience.”<sup>27</sup> Jaspers was thinking of the “border situation” of his friends living under Nazi rule. Early on, people were faced with life and death decisions of whether to flee the country or stay a bit longer to see what happens. One’s natural psychological tendency, he argues plausibly, is to avoid the decision and continue on as if everything were normal for as long as possible. One can only imagine why this is so. Perhaps people cannot quite bring themselves to believe it’s happening. Perhaps, Jaspers suggests, they did not expect these events, but rather, expected things to go on as they always had in their previous experience. Perhaps, Jaspers contends, they think they can tolerate it until it’s over—hoping things will improve.<sup>27</sup> Another existentialist philosopher, Gabriel Marcel, also warned against this tendency to be ‘crispified’ in our familiar habits and ideas.<sup>27</sup> Unfortunately, this response of inertia is not what the situation under Nazism demanded. Some people saw the coming dangers, and, if they had the means, fled Germany and Austria right away, realizing “that life could not continue unaltered”.<sup>27</sup> They were ‘open’ to what the situation demanded.

The analogy here is that humanity is now in a global ‘border situation’ with the global climate and its planetary life support systems. The environmental crisis we are in today, from climate change impacts to plastic pollution, is testing our moral compass and demanding us to open our minds to the realities on the ground being revealed by scientific evidence. Just as in Jaspers’ analogous context, recent warnings about the scope of the problem are difficult to take in. It is hard to absorb the fact that it is happening, even if one knows, intellectually, that it is. Life experience leads many people to expect things to go on as they always have before. Many people cannot grasp the proportions of the crisis; and, if they do, they might not see the urgency to act within the 10-12-year window that is being urged by some. Humanity is at

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<sup>24</sup> We Made The Coronavirus Epidemic by Ouammen, D.

<https://www.nytimes.com/2020/01/28/opinion/coronavirus-china.html> (Accessed Jan 28, 2020)

<sup>25</sup> Kierkegaard, S., *Either/Or* (D. F. Swenson and L. M. Swenson translators). Princeton University Press: New York, 1944.

<sup>26</sup> Detmer, D., *Sartre Explained: From Bad Faith to Authenticity*. Open Court Publishing Company: Chicago, 2008.

<sup>27</sup> Bakewell, S., *At the Existentialist Café*. Alfred A. Knopf: Canada, 2016.

cross-roads: will we wishfully assume that environmental support systems will automatically maintain themselves? Will we remain ‘crispified’ in business-as-usual? Or, will we perceive the challenge of our time, and meet the responsibility of consciously creating “new ways of living”<sup>28</sup> by transcending this global border situation?

### The moral imperative to act

A popular poem written at the start of the COVID-19 pandemic by Kitty O’Meara urges us all to “create new ways to live”:<sup>28</sup>

*And the People Stayed Home,  
And when the danger passed,  
and the people joined together again  
they grieved their losses,  
and made new choices,  
and dreamed new images,  
and created new ways to live  
and heal the earth fully,  
as they had been healed.*

However, one tempting way to avoid facing up to the responsibility of choosing to shift our ways of living, is procrastination: to wait for ‘more science’ about (1) the precise origin of pandemics, and the connection to human action, (2) the probability of another virus, and (3) the exact mechanisms and progress of climate change. This stance of waiting for more evidence might be supported by the common, but mistaken, impression that science can bring resolution to social, moral, and political problems simply by revealing facts of the world. Definitive evidence, one might suppose, will determine the course of action required to solve complex problems. It might be hoped that certain facts would compel a certain decision. Conversely, the lack of such evidence is often taken as sufficient reason for inaction until further, conclusive, evidence is gathered. The reasoning might be that one must *first* determine the truth about facts *before* action can be taken. Roger Pielke Jr. describes this as: “the linear model—get the facts right, then act.”<sup>29</sup>

The problem is that it is a mistaken assumption that action can only be justified by accompanying facts; and, vice versa, that facts will determine the appropriate action. This assumption is mistaken for two reasons. First, there can never be complete and certain knowledge about anything. Science does not work this way. The best it can do is provide good reasons to justify believing that something is *probably* true. To insist on a complete scientific certainty—a certainty that can never come—is unreasonable, argues philosopher of science Lee McIntyre, who writes: “We cannot hold reasoned belief hostage to

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<sup>28</sup> “And The People Stayed Home” by Catherine O’meara (aka Kitty O’meara). <https://the-daily-round.com/2020/03/16/in-the-time-of-pandemic/> (accessed July 15, 2021)

<sup>29</sup> Pielke, R., When Scientists Politicize Science: Making Sense of Controversy Over The Skeptical Environmentalist. *Environ. Sci. Policy* 2004, 7 406.

certainty”.<sup>30</sup> McIntyre is particularly worried about science-deniers who have an “all or nothing” attitude towards belief “until the definitive experiment has been done”.<sup>30</sup> The same point can be made of this situation of environmental harms. Evading a belief, unless there is absolute proof, is unreasonable because there can never be such certain verification.

Secondly, factual disputes alone cannot guide decision-making on political and ethical matters. Science cannot tell us what to do. Reasons-for-*belief*, are different than reasons-for-*action*. It is possible to have good reasons for *inaction* despite the *certainty* of the facts. Similarly, it is possible to have good reasons for *action* despite the *lack of certainty* on the facts. It is a mistake to think that facts completely structure the moral implications for our duties and what actions are required on our part. It is a matter of logic that the moral ‘ought’ does not follow simply from scientific facts. A moral argument would require additional moral language and meaning in addition to facts, which might include a notion of unfairness; or human rights; or a cost-benefit calculation of anthropocentric (human-centered) benefits.

For example, even if all the facts and details of climate change were certain and agreed upon by absolutely everyone, this would still not, however, *determine* a course of action that we are morally obliged to take. One might be tempted to think that the facts imply clear moral obligations to reduce our use of fossil fuels, and to protect carbon sinks such as the Amazon rain forest. Yet, this simple inference leaves out the moral reasoning needed. There would still be a question about whether to do *anything at all*. Some people might not be willing to take preventative measures against climate change because they fear catastrophic damage to the economy. They might reason that the benefits accrued from the use of fossil fuels outweigh the disadvantages. Or, some might wish to chop down the rainforest if they thought that there were moral and political arguments in favour of doing that.<sup>31</sup> Others may prefer to wait, and hope for new technological innovations that may come sometime in the future.

Suppose, on the other hand, that the facts were in dispute. The uncertainties might then be used to justify inaction on greenhouse-gas reducing initiatives—because they are assuming that scientific certainty is required before any action to reduce greenhouse gas emissions can be justified. The point here is simply that *facts alone* will not determine which course to choose. Scientific descriptions cannot direct our moral duties. Facts don’t determine a course of action. Moral action is also not dependent on the certainty of facts. It is possible to have good reasons for action despite the lack of certainty or a certain belief in the facts. This means that we, as people, and nations, must take responsibility for an existential decision that will determine what kind of people we are, and what values we have. Waiting for more evidence is really pretending that we have not made a decision. Sartre would call this self-deception “bad faith,”<sup>26</sup> where we absolve ourselves of responsibility for making a decision, and just let events unfold. This echoes Quammen’s suggestion, above, that the COVID-19 pandemic was a foreseeable consequence of our actions and decisions, and not merely bad luck.

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<sup>30</sup> McIntyre, L., *The Scientific Attitude*. The MIT Press: Cambridge, MA, 2019.

<sup>31</sup> Schellenberger, M. Why Apocalyptic Claims About Climate Change are Wrong. Forbes, Nov 25. Accessed at: ForbesClimate.pdf (UVIC.ca)

## A Proposal for an evidence- and values-based framework in decision making

When one considers how to respond to the planetary crisis we are in today, we must realize that the questions cannot be answered solely by the scientific method but must include ethical questions. This can be seen by considering the kinds of errors possible when coming to a belief.

There are two types of mistakes possible in science, known as Type I and Type II errors. Type I errors involve believing something to be false when it is true. The mistake is in missing out on the truth. Type II errors occur when believing something to be true when it really is false. This is the mistake of being duped. In other words, when it comes to believing in the facts, there are only two ways of getting things right: believing something to be true when it really is true, and believing something to be false when it really is false. Science is structured to prefer risking Type I errors over the possibility of a Type II error. This is because Type I errors result only in a delay in coming to the truth, while Type II errors can weaken the whole edifice of knowledge. On a foundationalist view of epistemic justification, “all knowledge or justified belief rest ultimately on a foundation of non-inferential knowledge or justified belief.”<sup>32</sup> Science is built on strong foundations, and most of our beliefs are interconnected with other beliefs. Thus, when a foundationalist is forced to choose between the two types of errors described above, the preference is not to risk infecting those foundations upon which is built a scientific house of cards. Thus, one should suspend judgement about belief until a high level of certainty is achieved. This way of thinking guarantees against believing incorrectly. “*We will just have to wait for the truth*”, the careful scientist would say. This makes sense—if all that matters is accurate belief. The “truth”, in the abstract sense, is not going anywhere, and a high degree of scepticism will improve one’s chances of discovering it.

However, the need to wait for the truth can create problems for action-related decisions. If we adopt this attitude of scientific caution with respect to accepting knowledge—the suspension of belief until higher certainty can be reached—then the burden of proof will lie with those who assert that there exists a probable environmental risk, rather than with those who want to continue business-as-usual. If someone raises an environmental alarm, it is up to them to back this up with facts that can be believed with a high level of certainty. This will guard against accepting alarms prematurely. Of course, the waiting for certainty leaves open the other type of error, with the obvious risk that those environmental alarms might be true, and require precautionary action before the required certainty level is achieved.

One can avoid the predictions of environmental catastrophe by reversing priorities. The question is best reframed in terms of finding reasons-for-action, rather than reasons-for-belief. Environmental risks do not, in the end, come down to certainty of belief in facts, because, as explained above, facts do not determine moral action. This reversal does not prioritize the risks to truth, or risks to false belief. Instead, the focus is on the moral gamble concerning action and inaction. When we assume that we can afford to wait for more information, we are making a bet. Yet some risks, some gambles, are not worth taking; and others are not morally justifiable—and this launches a conversation about moral risks. These are arguments for taking action—not about what to believe. We argue that when faced with a decision

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<sup>32</sup> Hasan, A.; Fumerton, R., Foundationalist Theories of Epistemic Justification. In *The Stanford Encyclopedia of Philosophy* Zalta, E. N., Ed. <https://plato.stanford.edu/archives/fall2018/entries/justep-foundational/>, 2018 (Fall).

about *how to act* in situations of uncertainty and high stakes, then we must base our decision on *ethics* (that is consistent with the state of science at the time).

Those familiar with this reasoning will recognize what is known as the precautionary principle, which states that the lack of certainty of belief should not be taken as a reason for lack of precautionary action.<sup>21</sup> We have briefly sketched out this argument emphasizing the distinction between belief and action. We believe that this distinction characterizes the “border situation” dilemma presented by the COVID-19 pandemic. The stakes are high. The temptation of many is to return as quickly as possible to the business-as-usual way things were before. However, we urge that it be remembered that scientific considerations are not the only frame needed to address our situation.

Today we are faced with momentous decisions about environmental risk. One might be tempted to avoid the decision by waiting for more scientific information. However, in this case of an existential risk to our way of life on the planet, the practice of scientific reasoning to suspend judgement about *belief* is misplaced. It should be replaced with reasons for *action*. We should make decisions based on current and imperfect states of scientific understanding, while also taking into account political, ethical, and cultural reasons. The COVID-19 pandemic has presented us with a challenge, and an opportunity to make big changes. J. Qiu suggests “We need to move beyond responding to viruses. The best way forward is prevention.”<sup>10</sup> This would require policies and lifestyle changes that parallel the magnitude of the threat. We may not clearly know the magnitude or likelihood of that threat—but we should not wait to find out. Whatever the facts, one can act for *moral reasons*. One can take action *based on gambling and risk of harm*. People are morally responsible for the harms they cause, and should take action to prevent such harm.

## Conclusions

Humanity has an unprecedented opportunity to create a new ‘normal’ that incorporates lower greenhouse gas emissions into healthier daily lifestyles as the world is emerging from the pandemic. While scientific data has been mounting for decades providing dire warning about the impacts that carbon intense business-as-usual would have on natural systems that sustain modern civilization as we know it, many people confuse questions of *what-to-believe-is-true*, with questions of *what-one-should-do*. But belief and action are two very different things. When one is seeking the truth; namely, what to believe, one needs some measure of certainty. One cannot *choose* what to believe, because the criterion for belief is evidence. Yet, in cases of uncertainty, the only way out of this uncertainty is the long wait for inductive confirmation. However, one need not wait before deciding to take action. To justify action, one does not need absolute certainty. All one needs is a *probability*, or a *sense of reasonableness*. One does not need to know that the theory of climate change is certainly true, nor that the risks of pandemics are completely understood, in order to take action in response to them. The decision becomes a *moral question*, not a factual one. Thus, under uncertainty of the facts, the criterion for action must include moral values. People have acted on threats of war, or risks to public health, without positive proof that such threats will be realized. Their reasons for actions are not based in evidential proof, but rather, in moral considerations of what risks are morally acceptable. We have witnessed a glimpse of the environmental benefits that can result from a different way of living. The challenge now is to preserve many of those benefits while still maintaining a good quality of life. This will require reflection on priorities and ethical risk. The choices made as the world emerges from the COVID crisis will reveal our true values and priorities.



**Hind A. Al-Abadleh** is the 2021-2022 University Research Professor at Wilfrid Laurier University. Her research interests are in the fields of atmospheric chemistry, geochemistry, environmental remediation, and environmental impacts of nanomaterials with the overarching goals of advancing knowledge, improving predictive power of climate and pollutant transport models, and influencing policies and wider community engagements on research funding, climate action and environmental stewardship.



**Stephen F. Haller** is Associate Professor in the Department of Social and Environmental Justice, Wilfrid Laurier University, Brantford campus. His education is in geochemistry and philosophy; and his research interests are focussed on philosophical problems related to science policy, and applied ethics—especially ethics of tourism. He has a particular interest in environmental issues, especially predictions of global catastrophe and the ethics of decision-making under uncertainty and great risk. He is the author of *Apocalypse Soon?: Wagering on Warnings of Global Catastrophe*, McGill-Queen's University Press, 2002.



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