

# WHAT IS CLIMATE CHANGE? POLICY CONSEQUENCES OF DIFFERING POLITICAL AND SCIENTIFIC DEFINITIONS

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The possibility that emissions of greenhouse gases may change the climate requires action on two parallel paths. First, over the long term, reducing the effect of greenhouse gases on the climate system will require decarbonization of our energy system. At the same time, no matter how energy policies evolve, all available evidence shows little reason to believe that humans will ever control the climate. So, second, society will have to reduce its growing vulnerability by improving its capacity to prepare for, and respond to climate events and their effects. But while the need for these actions seems clear, the Framework Convention on Climate Change (FCCC), the predominate approach to climate change, is hopelessly mired in political stalemate and consequently will contribute little to needed action.

Stalemate results in large part from the basic design of the FCCC, which at its foundation is based on a highly restricted definition of “climate change,” focused only on changes in climate that result from greenhouse gas forcing of the climate system. This restricted definition may make sense from some abstract, theoretical perspective, but it has also set the stage for inaction in the real world of politics and policy. Supporters of business-as-usual could not have wished for a more effective recipe for protracted inaction. This paper seeks to explain how “climate change” has been misdefined under the FCCC, discusses some of the implications and suggests a possible alternative.

## A Thought Experiment

Consider the following thought experiment. Imagine the world as described by the FCCC. In this world the human use of fossil fuels leads to emissions of greenhouse gases, which lead to changes in the climate, which in turn result in undesirable effects on people and the environment. Let’s call this FCCC World. Now imagine an alternative world in which everything is as it is in *FCCC World*, but with one important difference. In this world instead of the human use of fossil fuels leading to changes in climate, the source of change is instead a small strengthening of the intensity of the Sun. In *Bright Sun World* the changes in climate and effects on people and the environment are identical to FCCC World; the two worlds differ only in the source of the climate forcing.

In my classes, I introduce this thought experiment and then ask the students to discuss how their policy recommendations might differ between FCCC World and Bright Sun World. Someone in every class starts out by saying that in Bright Sun World we wouldn’t need any policy beyond business-as-usual because the source of change is natural, coming from the Sun. This is quickly overturned when someone else points out that we would still want to adopt policies to respond to the effects – for instance, if you live on the coast you will still want to buy hurricane insurance in either scenario.

This typically leads someone to claim that in Bright Sun World adaptation policies would be preferred and in FCCC World mitigation would be preferred. A whole set of Socratic questions then follows: If we expect to modulate the Earth system in desirable ways if the change is human caused, why not if the cause is natural, we dam rivers after all? If we would focus on adaptation in Bright Sun World why wouldn't we also focus on adaptation in FCCC World? Is changing the energy habits of 6 billion people really more tractable than modulating the global earth system via carbon sequestration or other strategies of geoengineering? Such questions quickly reveal many assumptions that underlie approaches to dealing with global climate change, assumptions that are rarely discussed, much less evaluated. One of these assumptions focuses on organizing policy around the source of the forcing of the climate system, which is the primary approach under the FCCC.

Under the FCCC the term “climate change” is defined as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability over comparable time periods.” This definition stands in stark contrast to the broader definition used by the Intergovernmental Panel on Climate Change (IPCC) which states that climate change is “any change in climate over time whether due to natural variability or as a result of human activity.” John Zillman wrote in 1997, “There is a serious inconsistency between what the IPCC Working Group (WG) I scientific community regard as “climate change” and what constitutes “climate change” in the language of the Convention - an inconsistency which cannot help but lead to confusion in the public mind ...”<sup>1</sup> So if the sun were to get a little more intense resulting in “climate changes,” these would in fact not qualify as climate changes under the FCCC definition. Moreover, climate changes resulting from human-caused influences on the climate system other than those that affect the chemistry of the atmosphere – such as land use effects on climate – are similarly excluded under the FCCC.<sup>2</sup>

This thought experiment sets the stage for this paper's argument that the FCCC has misdefined climate change, leading to the illogic of Article 2 of the FCCC, which calls for prevention of “dangerous interference” in the climate system. Alternative approaches to climate policy based on a more scientifically sound and practically robust definition of “climate change” may offer greater likelihood of moving beyond the present gridlock to the benefit of people and the global environment.

## **The Illogic of FCCC Article 2**

The focus in the FCCC on only those climate changes that result from anthropogenic greenhouse gas emissions means that a prerequisite for action, politically if not practically, is the ability to identify climate changes related to the greenhouse gas forcing

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<sup>1</sup> Zillman, J. W. 1997. The IPCC: A view from the inside, Australian APEC Study Centre, <http://www.apec.org.au/docs/zillman.pdf>

<sup>2</sup> Pielke, R.A. Sr., 2002: Overlooked issues in the U.S. National Climate and IPCC assessments. *Climatic Change*, 52, 1-11.

and to ascribe a cause to those changes. In the jargon of the climate community, this is called “detection and attribution” and in the language of the FCCC it is “dangerous anthropogenic interference.” The need for science to detect and attribute climate change is codified in the FCCC Article 2, which states that the ultimate objective of the FCCC is “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous atmospheric interference with the climate system.”<sup>3</sup> Under the FCCC, without such detection and attribution there is no reason to act.

The notion of “dangerous interference” follows directly from the FCCC definition of climate change. The implementation of the FCCC in terms of specific emissions concentration targets thus depends upon determining some threshold above which climate change becomes dangerous and detecting that change and attributing it to greenhouse forcing. If climate change is not detected, or is not attributed to greenhouse gas forcing, then arguably the FCCC provides no cause for action. This approach contributes to the politicization of the science of climate change. If the “threshold” of dangerous interference is subject to interpretation then it becomes possible (and convenient) for various adherents to map the threshold onto their political positions determined through other means. For example the Administration of George W. Bush claims that “no one can say with any certainty what constitutes a dangerous level of warming, and therefore what level must be avoided.”<sup>4</sup> One scholar observes that “like a Rorschach test, reactions to the Kyoto Protocol generally reveal more about the speaker than about the protocol.”<sup>5</sup> Not only does the notion of “dangerous interference” enplace science as arbiter of what ultimately are political considerations that science cannot resolve, it is inconsistent with how climate actually affects society and the environment,<sup>6</sup> Article 2 is an obstacle to effective action on climate change because of its focus on the notions of both “dangerous” and “interference.”

The notion of a “dangerous” climate suggests that a threshold exists that separates a “dangerous” climate from one that is “not dangerous.” But the impacts of climate are not the result of a process in which climate disrupts a static society or the environment. Reality is much more complex for two reasons. First, society and the environment undergo constant and dramatic change as a result of human activities. People build on exposed coastlines, floodplains, and in deserts. Development, demographics, wealth, policies and political leadership change and evolve over time. These factors and many more contribute to the vulnerability of populations to the impacts of climate-related phenomena. Different levels of vulnerability help to explain, for example, why a tropical cyclone that makes landfall in the United States has profoundly different impacts than a similar storm that makes landfall in Central America. Consequently, the degree to which climate is “dangerous” differs around the world and further depends upon how different communities value security and risk. The IPCC states in Article 2 of the FCCC that

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<sup>3</sup> <http://unfccc.int/resource/docs/convkp/conveng.pdf>

<sup>4</sup> <http://www.whitehouse.gov/news/releases/2001/06/20010611-2.html>

<sup>5</sup> D. Bodansky, 2002. US Climate Policy after Kyoto: Elements for Success, Carnegie Endowment for International Peace Policy Brief. <http://www.ceip.org/files/pdf/Policybrief15.pdf>

<sup>6</sup> See, e.g., B. C. O’Neill and M. Oppenheimer, 2002. Dangerous Climate Impacts and the Kyoto Protocol, *Science* 296:1971-1972. S. Schneider, 2001. What is ‘dangerous’ climate change? *Nature* 411:17-19.

defining “dangerous interference” necessitates “value judgments determined through socio-political processes, taking into account considerations such as development, equity, and sustainability, as well as uncertainties and risk.”<sup>7</sup> In a world where for many communities climate is already quite “dangerous,” identifying a threshold becomes a matter of judgment, subject to differing perspectives and interests. But “dangerous” also is variable in an objective sense, precisely because vulnerability varies with levels and patterns of development and other societal factors.

But not only is the notion of what is “dangerous” problematic, so too is the notion of “interference.” This is the case for two reasons. First, there are many reasons why a particular community or ecosystem may experience adverse climate impacts under conditions of climate stationarity (i.e., under conditions of no climate change, human caused or otherwise). For example, a historic flood in an unoccupied floodplain may be noteworthy, but a similar flood in a vastly populated floodplain is a disaster. The development of the floodplain could be the change that results in a phenomenon becoming dangerous, thus the *interference* that leads to adverse impacts results from human occupancy of the floodplain. Under the FCCC, any such change would not be cause for action, even though adverse effects may still result. Climate occurs in a context of dramatic and rapid societal changes that affect not only society itself, but the environment in which society inhabits. As research indicates, the “interference” of climate to human or environmental systems is considerably less significant than the “interference” to such systems resulting from large-scale societal changes.

A second challenge in documenting “interference” has to do with the nature of the global earth system itself. Climate changes at all times scales and for many reasons, not all of which are fully understood or quantified. Consider for example abrupt climate change. A review paper in *Science* observes that “such abrupt changes could have natural causes, or could be triggered by humans and be among the ‘dangerous anthropogenic interferences’ referred to in the [FCCC]. Thus, abrupt climate change is relevant to, but broader than, the FCCC and consequently requires a broader scientific and policy foundation.”<sup>8</sup> In an important respect, the phrase “climate change” is redundant.

Consider another example. A group of researchers recently suggested that changes in regional land use patterns have potential to alter regional and global climate, “Mitigation strategies that give credits or debits for changing the flux of CO<sub>2</sub> to the atmosphere but do not simultaneously acknowledge the importance of changes in the albedo or in the flows of energy within the Earth system might lead to land management decisions that do not produce the intended climatic results.”<sup>9</sup> These researchers raise the possibility that efforts to extract carbon dioxide from the atmosphere and store it in vegetation may have the perverse effect of changing the energy balance of the earth system, resulting in an additional source of human disruption, the exact opposite of the intentions for sequestration. Preventing interference in the climate system by focusing only on

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<sup>7</sup> <http://www.ipcc.ch/pub/un/syreneng/spm.pdf>

<sup>8</sup> Alley, R.B., et al., 2003: Abrupt Climate Change, *Science*, **299**:2005-2010.

<sup>9</sup> Marland, G., et al., 2003: The climatic impacts of land surface change and carbon management, and the implications for climate-change mitigation policy. *Climate Policy* **3**:149-157.

greenhouse gas forcing makes sense from a scientific perspective only if other potential natural and human-caused changes in the climate system are by comparison insignificant. This assumption appears to be the perspective of the FCCC, which in 1996 observed that its definition of “climate change” did not differ significantly from that of the IPCC because “in many instances the two uses will in effect be the same, and this is particularly true for projections of climate change over the next century.”<sup>10</sup> *For the IPCC and FCCC usages of the phrase “climate change” to be synonymous there must be no other significant sources of changes to the climate system other than greenhouse gas forcing.* If this assumption about the basic science of the global earth system is incorrect, then the FCCC has set the stage for significant problems in its implementation.

In short, the idea that science can “detect and attribute” interference in the climate system related to greenhouse forcing is problematic in a world where climate changes on all time scales because of a range of both natural and human forcings. And even if science could detect and attribute climate change, such changes occur in a world in which climate is already dangerous in varying degrees, based both on differing perceptions of what is or is not “dangerous” but also because of decisions that affect socioeconomic conditions that, in turn, affect vulnerability, and hence “danger.” Because of the illogic of Article 2 of the FCCC, considerably more attention has been paid not only by researchers but also political advocates to the details of detection and attribution than to providing decision makers with useful knowledge that might help them to improve energy policies and reduce vulnerabilities to climate.<sup>11</sup> It is not a large leap to then suggest that the gridlock over climate change results not from either the science or politics of climate change, but more fundamentally from the implications and incentives that result from the way that the climate change issue has been framed within the FCCC itself.

### **Consequences for Policy**

The different definitions of “climate change” held by the FCCC and IPCC may have resulted for intellectual reasons, e.g., the assumption that the climate system is otherwise stationary absent a greenhouse gas forcing, for pragmatic reasons, e.g., there are already international efforts focused on development and natural disasters, or political reasons, e.g., a focus on greenhouse gases locates the problem in the domain of energy policy. Whatever the underlying reasons for the different definitions, it is clear that the FCCC definition of climate change leads to bias against adaptation and politicization of science.

#### *A Bias against Adaptation*

As a consequence of the FCCC definition, “adaptation” refers to actions in response to climate changes attributable solely to greenhouse gas emissions. It does not refer to efforts to improve societal responses to changes in climate that result from “natural”

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<sup>10</sup> <http://www.cop4.org/resource/docs/1996/sbsta/07a01.pdf>

<sup>11</sup> See, for example, the controversy over Chapter 8 (on detection and attribution) of the IPCC Second Assessment report, M. Lahsen, 1999. The Detection and Attribution of Conspiracies: The Controversy Over Chapter 8” in G. E. Marcus (ed.) **Paranoia Within Reason: A Casebook on Conspiracy as Explanation**, Vol. 6, Late Editions Series of Cultural Studies for the End of the Century.

climate variability or change, or human-caused changes that result from factors other than those specified by the FCCC. An important consequence of this definition is that adaptation has only “costs” because adaptive responses would by definition be unnecessary if climate change could be prevented. For example in a report that seeks to interpret Article 2 of the FCCC the IPCC discusses mitigation policies in terms of both costs and benefits, while adaptation policies have only costs.<sup>12</sup> It is only logical that a policy that has only costs would be less preferable than a policy that offers the hope of benefits as well. This strange result occurs despite the fact that adaptation offers considerable potential for immediate and tangible benefits. This is an example of the counterproductive incentives and implications of the restricted definition of climate change under the FCCC.

In reality, adaptation policies also have benefits to the extent that they lead to greater resilience of communities and ecosystems to climate change, variability and particular weather phenomena. But from the restricted perspective of the FCCC it is logical for many to conclude (or assume) that preventative action is a better policy alternative and recommend adaptive responses only to the extent that proposed mitigation strategies will be unable to prevent changes in climate in the near future. Hence, adaptation has been characterized as “a kind of laziness, an arrogant faith in our ability to react in time to save our skin.”<sup>13</sup> But this perspective overlooks the fact that the impacts to people and the environment that are the basis for concern about climate change are influenced by many factors other than greenhouse gases and adaptation to climate is needed under any scenario put forward by the IPCC. The FCCC approach is like a set of blinders that directs attention away from adaptive actions that make good sense based on reducing societal and environmental vulnerability to climate impacts, independent of cause of those impacts.

### *Politicization of Climate Science*

A February 2003 article in *The Guardian* relates details of climate policy debate in Russia that show the absurdity of the present approach.<sup>14</sup> The article reports that several Russian scientists “believe global warming might pep up cold regions and allow more grain and potatoes to be grown, making the country wealthier. They argue that from the Russian perspective nothing needs to be done to stop climate change.” They believe that not only will climate change not result in “dangerous interference” but that it will result in what might be called “beneficial interference.” As a result, “To try to counter establishment scientists who believe climate change could be good for Russia, a report on how the country will suffer will be circulated in the coming weeks.” Science is thus enlisted not only to show that human activities affect the climate, but to show that resulting changes will become dangerous.

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<sup>12</sup>IPCC Second Assessment Synthesis of Scientific-Technical Information relevant to interpreting Article 2 of the UN Framework Convention on Climate Change, <http://www.unep.ch/ipcc/pub/sarsyn.htm>

<sup>13</sup> A. Gore. 1992. **Earth In the Balance**, Houghton Mifflin, New York.

<sup>14</sup> P. Brown, 2003. Russia urged to rescue Kyoto pact. *The Guardian* 26 February.



Why does this matter? The FCCC forces political combatants to assert certainty about the climate future (dangerous or not?) when in reality uncertainty may be irreducible. Such certainty is necessary to promote or campaign against ratification of the Kyoto Protocol. For example, one environmental advocate observes, "Russia's ratification [of the Protocol] is vitally important. If she doesn't go ahead, years of hard-won agreements will be placed in jeopardy, and meanwhile the climate continues to change." Any scientific result that suggests that Russia might benefit from climate change stands in opposition to Russia's ratification. Science that shows the opposite supports Russia's participation. In this manner, the science of climate change becomes irrevocably politicized. Left in the wake of this situation remains the challenges of promulgating Russian agricultural policies, which depend upon many more factors than just climate, and need to be considered under conditions of irreducible uncertainty about the details of the climate future. The FCCC definition of climate change provides a political motivation for science that unequivocally shows or dispels "dangerous interference." The FCCC makes it difficult to consider, much less enact, policies that do not depend upon certainty in future outcomes or are robust with respect to the climate future, irrespective of the source of change.<sup>15</sup> There is no room under FCCC Article 2 for uncertainty about the climate future; it is either dangerous or it is not. Conversely, the IPCC notes that climate change requires "decision making under uncertainty."<sup>16</sup>

Accordingly, some dismiss uncertainty by arguing that there will be no benefits of climate change. For example, according to Klaus Topfer, Executive Director of the United Nations Environment Programme, "There are no winners, only losers, in the climate change scenario. Now is time to act collectively and decisively."<sup>17</sup> These anecdotes reflect the prescience of an analysis made by Mickey Glantz in 1995, "While scientists and policymakers formally discuss only losses associated with a global warming, others may perceive that there will be positive benefits as well... This could sharply reduce the credibility of the proponents for taking action, lessening the chances for any response, preventive, mitigative, or adaptive."<sup>18</sup>

Not only does Article 2 create a bias against adaptation, in forcing claims to certainty about the future, the FCCC forces claims to certainty which inevitably lead to a politicization of the science of climate change. An approach that is more consistent with the realities of science and needs of decision makers would begin with a framing commensurate with these realities. Under the FCCC climate change is viewed as a single, linear problem requiring a linear solution, when in fact it is many, inter-related problems requiring a diversity of policy responses.<sup>19</sup>

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<sup>15</sup> R. J. Lempert and M. E. Schlesinger, 2000. Robust Strategies for Abating Climate Change, *Climatic Change*, **45**: 387-401.

<sup>16</sup> <http://www.ipcc.ch/pub/un/syren/spm.pdf>

<sup>17</sup> UNEP Press Release, Global Warming: Asia Vulnerable, 20 February 2001, <http://206.67.58.208/uneaproap/html/nr/nr01-01.htm>

<sup>18</sup> Glantz, M.H. 1995: Assessing the impacts of climate: The issue of winners and losers in a global climate change context. Pp. 41-54 in: *Climate Change Research: Evaluation and Policy Implications*, S. Zwerver, et al. (Eds.). Amsterdam: Elsevier.

<sup>19</sup> See Pielke, Jr., R. A. 2003. *Misdefining Climate Change: Consequences for Research and Action*, Workshop on Mitigation and Adaptation, Kulterwissenschaftliches Institut, Essen, Germany.