

1035-91-2021      **Graciela Chichilnisky\*** ([chichilnisky@columbia.edu](mailto:chichilnisky@columbia.edu)), Columbia University, Department of Statistics, New York, NY 10027. *The Mathematics of Climate Change*.

How to evaluate the risks of Climate Change, and more generally, how to plan and make sensible decisions for our long term future? The standard approach relies on three axioms and a representation theorem of Von Neumann, Morgenstern and Milnor that is widely used today. We show however that this approach ignores catastrophic risks in the long term future, such as the risks of global warming, and may be responsible for the inaction that led to the current environmental crisis. We update the classic axioms with more sensible axioms - and provide a new representation theorem that is sensitive to catastrophic risks in the long run future. We show that this approach can resolve the current global warming situation. In mathematical terms, we obtain a new type of functional not previously used in the calculus of variations, consisting of a convex combination of countable and purely finitely additive measures, and explore its practical consequences for making sensible decisions for our long run future. (Received September 21, 2007)