



A Systemist's and Agathonist's Take on Geoethics

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Geoethics is an epistemic-normative practice that dynamically integrates geoscientific knowledge with ethical reasoning to guide tellurian entanglements of people and Earth. It highlights agency, virtue, responsibility, and knowledge as core tenets¹. When geoethical thought is extended to public issues, it supports civic participation while maintaining its foundation in Earth System Science^{2,3}.

Analysing geoethics through the prism of systemism, scientific realism, praxeology (means–end analysis), and agathonism (human flourishing), this study explores mutual conceptual alignments of geoethical practice and Mario Bunge's philosophical program^{4,5}.

- Systemism holds that every entity is part of a system, composed of components, relations, and mechanisms across levels, including non-mechanical ones such as algorithms or LLMs.
- Scientific realism & fallibilism: truth is objective but partial; knowledge grows by conjecture, test and error correction.
- Praxeology (means–end): responsible action pursues value-guided ends using empirically supported means, with consequences assessed—including long-term effects—and endorses equality, liberty, democracy, solidarity, justice, and competence for institutions.
- Axiology—Agathonism: ethics aims to promote human flourishing (health, knowledge, solidarity, justice, freedom), rejecting radical moral relativism while allowing contextual trade-offs. Bunge, drawing in part on Max Weber, rejected the idea of an absolute moral code and developed a humanist ethics that evaluates actions by their consequences, integrating commitments to truth and human well-being. His central maxim—“Enjoy life and help others live”—unites personal and collective flourishing.

Initially, systemism reframes agency as capabilities embedded in multi-level socio-ecological systems, requiring explicit description of components, relations, and feedback across scales. Realism and praxeology upgrade virtue and responsibility from personal dispositions to rule-governed routines, such as open data, code and access, registration of interests and affiliations, independent replication, reviews, and audits. Finally, agathonism specifies non-relativist ends (knowledge, welfare, liberty, solidarity, justice) and converts universal rights into side-constraints

and metrics for practical trade-offs.

A proposed alignment checklist follows:

-System model (Are components, relations, and cross-scale mechanisms explicit?),

Ends-means coherence (Do chosen means have evidence for and safety given uncertainties?),

-Value vector (How are welfare, knowledge, freedom, solidarity, and justice advanced or constrained?),

-Evidence protocol (What are the reproducibility and transparency provisions (data, methods, replication funding)?),

-Participation efficacy (What binding levers do non-expert stakeholders possess, and how is impact measured?),

-Responsibility pathway (Who is answerable for unintended effects, and what are remediation triggers and funds?).

Overall, the proposed conceptual alignment moves geoethical practice from laudable aspirations to evidence-led, publicly justifiable, and purpose-oriented designable mechanisms that support human flourishing within planetary boundaries.

¹Di Capua, G., Peppoloni, S., Bobrowsky, P. (2017). The Cape Town Statement on Geoethics. *Annals of Geophysics*, 60(0), 1–6. <https://doi.org/10.4401/ag-7553>.

²Bohle, M., & Marone, E. (2022). Phronesis at the Human-Earth Nexus: Managed Retreat. *Frontiers in Political Science*, 4(February), 1–13. <https://doi.org/10.3389/fpos.2022.819930>.

³Marone, E. & Marone, L. (2025). Enlightening the Anthropocene through Supradisciplinary Science and Education. In *Dialogues with the Earth Sciences*. Bohle M. & Nauen C. eds. Springer International Publishing 978-3-031-97445-8(ISBN).

⁴Bunge, M. A. (2001). *Philosophy in Crisis: The Need for Reconstruction*. Prometheus Books.

⁵Bunge, M. A. (2006). *Chasing Reality* (Toronto St). University of Toronto Press. <https://doi.org/10.3138/9781442672857>.