Human rationality and environmental protection

Milan Ilnyckyj

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In seeking to understand human behaviour, the assumption that people behave 'rationally' in a way that incorporates all available information and that considers all available options is often the starting point for both analytical and prescriptive analyses. While very few theorists of decision-making accept the factual accuracy of the rational model of self-interested utility maximization, the model can be used as a starting point. From there, theorists and scholars can seek to identify places in which observed behaviour fails to conform with what rationality seems to demand, as well as to evaluate the assumptions underpinning the rational model and their degree of correspondence with real decision-making practices. Common features of environmental problems — such as being widely distributed across space and time, involving scientific complexity and uncertainty, and including different incentive structures for different actors — often complicate the application of a rational model. Furthermore, from the perspective of effectively mitigating problems like loss of biodiversity, toxic air and water pollution, and climate change, it is necessary to identify ways in which decision-making processes have been lacking, and evaluate possible mechanisms for improving them.

1 | Research question

To what degree does a self-interested model of rational utility-maximization help scholars explain or understand decision-making in the realm of environmental policy? Which assumptions of the model are most problematic in this policy area? Also, for those who have adopted a normative project of mitigating environmental problems, in what ways can understanding of the rational model and its limitations provide guidance

for improving outcomes?

2 | The limitations of the rational model

In a 2014 *Encyclopedia Britannica* entry, Keith Nitta sketch out the key features of a rational decision-making model.[1] Such models assume that individuals are the primary unit of analysis for understanding decision-making (as opposed to organizational structures or groups), that these individuals seek to maximize their own welfare or utility, that they have access to all relevant information and are aware of all possible courses of action, and that they will ultimately choose to behave in the way that leads to the best possible outcome for themselves.[2] These features are also part of the definition of 'efficient markets', in which buyers and sellers both improve their utility by taking part in mutually-beneficial voluntary exchanges. If these assumptions are satisfied, markets may be expected to produce appropriate prices and decisions in response to scarcity, as well as to prevent choices that do more harm than good to overall human welfare.

The first objection to an efficient market account is the basic observation that transactions often affect third parties, producing positive and negative externalities that are not factored in to the decision-making of the parties making the exchange.[3][4] When coal is purchased for electricity production, neither the electricity utility nor the coal-mining firm is necessarily concerned about the toxic air and water pollution that coal-mining and burning will generate, nor the associated greenhouse gas emissions or habitat destruction and damage to biodiversity. Similarly, the positive externalities associated with protecting and enhancing ecosystem services often accrue to parties that do not pay for them, leading to under-provision.[5] Understood as 'market failures', externalities provide a major explanation for why markets need not always maximize societal utility. They also provide a convincing justification for various forms of regulation and government intervention.[6]

While humanity is altering the world with unprecedented rapidity and impact, full scientific understanding

[1] Nitta, *Decision making*.

[2] Macdonald, "An introduction to decision making and environmental decision making".

[3] See: Meyer, "Changes in Population and Society", p. 39–49.

[4] Reinhardt, "Chapter 1. The Environment as a Business Problem", p. 5–6.

[5] On the scale and nature of ecosystem services, see: Millennium Ecosystem Assessment Board, *Ecosystems and Human Well-Being*.

[6] For liberal environmentalists — as categorized by Jennifer Clapp and Peter Dauvergne among others — government action in response to externalities is the main task that must be undertaken to resolve environmental problems. Clapp and Dauvergne, *Paths to a Green World: The Political Economy of the Global Environment*.

of all the consequences of our choices does not yet exist. Indeed, the history of environmental decision-making includes many examples of choices that produced serious unintended side-effects. These include the use of tetra-ethyl lead as an anti-knock agent in internal combustion engines, leading to widespread environmental contamination; inadvertent harm to birds and other animals from pesticide use; the depletion of stratospheric ozone by chlorofluorocarbons (CFCs); and cases where the deliberate introduction of alien species into ecosystems has produced vast unwanted effects.[7][8] It is possible to enumerate some of the ways in which uncertainty constrains the applicability of a rational model:

1. The likelihood and seriousness of various risks often cannot be known in advance, particularly when it involves to non-linear relationships like those in the climate system[9]

2. Side-effects from choices may be unpredictable, and only possible to identify after they have been created

3. Overlapping environmental issues may render it infeasible to identify how much risk is coming from which source, as in the case of disagreement about the relative threat to polar bears from hunting and climate change[10][11][12]

4. Assumptions about technological change may prove incorrect. It's not clear, for instance, whether future technologies like affordable carbon capture and storage, improved renewables, or geoengineering might help control climate change[13]

5. People have limited horizons of understanding — they may perceive immediate and local effects from their choices, but miss those that are distant in space and time[14][15]

6. Detailed understanding of environmental problems often requires knowledge and expertise from many disciplines, from chemistry and atmospheric science to psychology and economics. Effectively bringing

[7] McNeill, *Something New Under the Sun: An Environmental History of the Twentieth-Century World*.

[8] On CFCs, see also: Speth and Haas, "Chapter 3: From Stockholm to Johannesburg: First Attempt at Global Environmental Governance", p. 54.

[9] Atmospheric scientist Wallace Broecker equates the climate to an "angry breast" which is being provoked in dangerous ways by human greenhouse gas emissions. Abrupt shifts between discrete states have been observed in the past. If replicated, such a shift could cause major problems for humanity. Broecker and Kunzig, *Fixing Climate: What Past Climate Changes Reveal About the Current Threat — and How to Counter It*, p. ix–xvi.

[10] See: Peacock et al., "Conservation and management of Canada's polar bears (Ursus maritimus) in a changing Arctic".

[11] Clark et al., "Polar bears and CITES: A rejoinder to Parsons and Cornick".

[12] Raboy, "Case Study: The challenge of environmental decision making — polar bears in the Canadian arctic".

[13] See: Meyer, "Changes in Population and Society", p. 35–9.

[14] In a way it's strange that so many people see an emphasis on local economies as a climate change solution, given that the essence of the problem is how nobody is presently allocating adequate attention to the aggregated consequences of local decisions around the world.

[15] Morrison-Saunders et al. describe the challenges of appropriate spatial and temporal 'coping' in the context of impact assessments: Morrison-Saunders et al., "Strengthening impact assessment: a call for integration and focus", p. 5–6.

all relevant information to bear may exceed the capacity of many individuals or groups.[16][17][18]

7. Decision-makers with strong pre-existing policy preferences may deliberately seek out only information that supports their present course of action[19]

Emilio Moran highlights the challenge of responding to uncertainty quickly enough to avert highly problematic outcomes, but without locking ourselves into a particular course of action before all relevant information is available:

> "Methods for acting under conditions of incomplete and uncertain knowledge are needed because the deteriorating condition of environmental resources do not permit the luxury of postponing action, yet require flexibility in adjusting decisions made on a shifting state-of-knowledge."[20]

Recognition that people cannot actually consider all possible courses of action, as well as determine the consequences of each for their utility beforehand, has led to the development of more psychologically sophisticated models of decision-making. These include bounded rationality and 'satisficing' models, where people are expected to consider and choose from among a limited range of options and not necessarily be able to make fully utility-maximizing choices.[21][22] People may also employ heuristics to reduce the cognitive burden associated with decision-making, though often at the cost of producing sub-optimal outcomes for themselves.[23][24] Many identified psychological tendencies are problematic from an environmental perspective. Gazzaniga et al. list several such tendencies, including the availability heuristic, the representativeness heuristic, confirmation bias, framing effects, and affective heuristics.[25] The list could also include the 'single action bias', in which people frequently respond to a problem by taking a single concrete action which may well be inadequate. Producing sustained and substantial behavioural changes is highly challenging.

[16] Raboy and Macdonald, "Course intro, initial model of decision making and the issue of interdisciplinarity".

[17] Harding, Hendriks, and Faruqi, "Chapter 8: Tools for Environmental Decision Making", p.224.

[18] Even in the sub-field of impact assessment, Morrison-Saunders et al. describe how "the proliferation of different impact assessment types creates separate silos of expertise and feeds arguments… excessive specialisation and a lack of interdisciplinary practice". Morrison-Saunders et al., "Strengthening impact assessment: a call for integration and focus", p. 2, 6.

[19] Harding, Hendriks, and Faruqi, "Chapter 8: Tools for Environmental Decision Making", p. 223-4.

[20] Moran, "Environmental Decision Making", p. 127.

[21] Nitta, *Decision making*.

[22] Hatch, "Organizational Decision Making", p. 272–5.

[23] Macdonald, "Individual environmental decision making, public opinion".

[24] Gazzaniga et al., "How Do We Make Decisions and Solve Problems?", p. 60–4.

[25] On framing, see also: Tversky and Kahneman, "Rational choice and the framing of decisions".

Another clear limitation of the rational model is the emphasis on single individuals making choices with only their own welfare as motivation. If this accurately described human behaviour, we would not expect to see any altruism or consideration for impacts that fall on future generations. Choices that may lead to the destruction of the world's coral reefs and the melting of the Earth's ice caps over the course of centuries may be highly appealing from the perspective of those who will benefit during their lifetimes from the behaviours that contribute to these outcomes, and who will die before the greater part of these impacts is felt. In various ways, from tipping in restaurants they will never visit again to donating organs to strangers to funding pension systems that will remain solvent after their demise, people are willing to make costly choices for the benefit of others. Models of decision-making which disregard such tendencies are therefore likely to be unable to fully account for observed human behaviours.

Institutional structures beyond the individual level also have important effects on environmental decision-making, particularly in the contexts of business and government.[26][27][28][29][30] In some cases, these forces can be modeled through game theory. For instance, free rider problems can be expected in cases where individuals cannot be excluded from enjoying the benefits of a costly decision, but where they cannot be compelled to contribute to those costs. Similarly, collective action problems can be expected in cases where no individual or small group has the capacity to alter outcomes without the assistance of a large number of other parties.[31] Models of decision-making that emphasize group or organizational dynamics include the intra-organizational models described by Keith Nitta, as well as bureaucratic politics models and those that incorporate principle-agent problems.[32][33]

The very idea of 'utility' as something which can be at least notionally measured and compared between

[26] See: Raboy and Macdonald, "Organizational environmental decision making: business firms".

[27] Macdonald, "Governmental environmental decision making: domestic and international".

[28] Hatch, "Organizational Decision Making".

[29] Reinhardt, "Chapter 1. The Environment as a Business Problem".

[30] Roberts, "Environmental policy making in government", p. 116–20.

[31] This has been especially evident in the context of climate change. Every state knows that even extreme domestic emission reductions will not substantially improve climatic outcomes in the absence of complimentary actions elsewhere. For industry, the argument that domestic controls on emissions will harm economic growth and jobs without producing environmental benefits has proven very effective at forestalling meaningful action.

[32] Nitta, *Decision making*.

[33] For an analysis of how being situated in government affects policy analysis, see: Howlett and Wellstead, "Policy Analysts in the Bureaucracy Revisited: The Nature of Professional Policy Work in Contemporary Government".

different people has been criticized. Alternative yardsticks for evaluating the soundness of environmental decisions do exist, including the six-part scheme described by Thomas Dietz.[34] While Dietz's approach includes consideration of "human well being" (not very specifically defined), it also incorporates procedural criteria like fairness in process and outcome, social criteria like fairness and creating opportunities to learn, and additional criteria like competence about facts and values and "relying on human strengths, not weaknesses". Even if we accept the utility yardstick conceptually, people often discount future utility substantially when compared with that in the near-term.[35] For instance, while a 'rational' life plan would incorporate sufficient saving to avoid financial difficulty in retirement, many people consistently choose to under-contribute to their retirement savings. On a macro level, people continue to use vast quantities of fossil fuels for relatively frivolous purposes like tropical vacation travel and luxury goods, while giving little concern to the climatic consequences this will exacerbate, even in their own lifetimes. Similarly, the strong emphasis of nearly all governments on short-term growth in gross domestic product may be creating problems that will substantially limit the prosperity and physical security of their citizens in the future.[36][37]

3 | Encouraging sustainability

One response to the obvious deficiencies of a rational account is to abandon the approach as a way of understanding human behaviour or designing improved decision-making processes. To choose one example of behaviour of questionable rationality, the level of public concern about a particular environmental problem often varies significantly and without relation to any changes in the seriousness of the issue itself; these "issue-attention cycles" make little sense from a rational perspective, but have been observed in many cases.[38][39][40][41] Alternative approaches include those that downplay individual thinking and agency in favour of structural

[34] Dietz, "What is a good decision? Criteria for environmental decision making".
[35] See: Harding, Hendriks, and Faruqi, "Chapter 8: Tools for Environmental Decision Making", p. 210.
[36] Raboy and Macdonald, "Overview of the environmental problem: Earth systems, human impacts and causes".
[37] Raboy and Macdonald, "Organizational environmental decision making: business firms".
[38] See: Roberts, "Environmental policy making in government".
[39] See also: Paehlke, "The Environmental Movement in Canada", p. 2–13.
[40] Toner, "Contesting the Green: Canadian Environmental Policy at the Turn of the Century", p. 71–120.
[41] On varying levels of interest in international conferences and processes, see: Speth and Haas, "Chapter 3: From Stockholm to Johannesburg: First Attempt at Global Environmental Governance".

explanations (or which seek to merge the two, as with bureaucratic politics models of self-interested decision-making within an organizational structure), as well as revised psychological explanations that seek a closer correspondence between theoretical predictions and empirically observed behaviours. From a normative perspective, however, there is cause to maintain the ideal of a rational model, provided the interests of all morally relevant actors are borne in mind. Deviations from pure rationality which have been identified can also be used to help design interventions that may improve environmental behaviour.[42]

Adapting the rational model to serve normative purposes, we must first consider mechanisms for internalizing externalities.[43] Where those externalities are negative, policy options include Pigouvian taxes, command-and-control regulations such as technological standards, and even the criminalization of environmental damage.[44] In order to address under-provision of public goods and positive externalities, governments can regulate, provide public funding through taxation, simply provide the goods in question themselves, and exhort individuals or firms to change behaviour.[45] Achieving such outcomes can be challenging politically, particularly when the costs of controlling externalities are concentrated on a few politically-influential actors while the costs of inaction are borne in a diffuse way by the population at large. This process is also complicated by the way in which "[m]arket failures do not crop up one at a time", but must often be addressed in parallel.[46]

Addressing uncertainty through policy interventions can be attempted in many different ways. Concepts like the precautionary principle — in which proponents of potentially risky courses of action are required to justify the risks — are one such mechanism.[47] Other authors highlight the importance of curtailing worst-case possibilities, even if doing so may reduce the average amount of utility arising from a set of choices.[48][49] Normatively, particular attention should be paid to cases where two distinct groups of people experience the

[42] Robert Gifford identifies a range of mechanisms through which the degree of environmental concern experienced by individuals might be enhanced, including environmental education, simulations, the power of stories and images, and organized public events: Gifford, "Chapter 3. Environmental Attitudes, Appraisals and Assessments", p. 63–4.

[43] See: Meyer, "Changes in Population and Society", p. 41–42.

[44] For discussion on a range of behavioural tools intended to alter outcomes, see: Harding, Hendriks, and Faruqi, "Chapter 8: Tools for Environmental Decision Making", p. 195–6.

[45] Roberts, "Environmental policy making in government", p. 120–8.

[46] Reinhardt, "Chapter 1. The Environment as a Business Problem", p. 5.

[47] See: Peacock et al., "Conservation and management of Canada's polar bears (Ursus maritimus) in a changing Arctic", p. 376–8.

[48] See: Shue, "Deadly Delays, Saving Opportunities".

[49] Craven, *What's the Worst That Could Happen?: A Rational Response to the Climate Change Debate*.

benefits and risks associated with the same decision, with care taken to avoid exploitative arrangements.

Some environmentalists highlight a need for human beings to become more other-regarding when it comes to the treatment of the Earth's natural systems. At a minimum, this is generally taken to mean incorporating consideration for the needs and interests of people all over the world and in future generations.[50][51][52] More expansively, the set of others who could be treated as morally relevant could grow to include highly intelligent non-human animals like primates and cetaceans. At a maximum, some endorse attributing moral value to entire ecosystems or nature as a whole. Expanding consideration in these ways would require de-emphasizing self-interest as a criterion for rational choice, perhaps replacing it with a more utilitarian notion of maximizing the total welfare of all morally-relevant entities.[53]

4 | Conclusions

While "[m]any decision-makers purport to have reached their decisions through intelligent, rational choice informed by complete, objective and value-free science", many scholars argue that "decision-making is value-laden, contested, and often uses incomplete data sets and inconclusive science".[54] In many distinct cases, empirical evidence shows that people improperly understand and weigh the options before them, fail to adequately anticipate all the consequences of choices, and behave in ways that are constrained by their psychological limitations and the institutional structures around them. That being said, if we accept the basic idea that the success or failure of decision-making can be evaluated in terms of the outcome choices have on morally relevant actors, there is cause for using a variant of the rational model as an ideal. From this perspective, limitations like incomplete information drive us to develop more sophisticated versions of the rational model which incorporates thinking about risks and uncertainties.

[50] As in the 1987 Brundtland Commission's definition of sustainable development as: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

[51] Speth and Haas, "Chapter 3: From Stockholm to Johannesburg: First Attempt at Global Environmental Governance", p. 66–7.

[52] See also: Schmid, "All Environmental Policy Instruments Require a Moral Choice as to Whose Interests Count".

[53] It is worth noting how the value of ecosystems and species as perceived in the abstract by distant individuals can clash with the local experiences of those who live in proximity to them. Polar bears may be an inspiring national symbol to Torontonians, while more often being a danger or a nuisance to those who live near them. The same can be said of megafauna elsewhere, such as rhinos and elephants in Africa. Creating an economic incentive for locals to engage in conservation efforts has been an important tactic in the protection of such species recently.

[54] Harding, Hendriks, and Faruqi, "Chapter 8: Tools for Environmental Decision Making", p. 222.

Those seeking to use rational decision-making as an ideal, rather than a description of ordinary behaviour, must take into consideration the various cognitive failings of individuals and organizations, make an appropriate judgment about which entities are to be treated as morally considerable, and develop appropriate mechanisms for addressing risk and uncertainty.

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