22

THE CHALLENGE OF LONG-TERM ENVIRONMENTAL POLICY

Detlef F. Sprinz

22.1 Introduction

Why is the world, at large, not successful at reigning in climate change impacts, curbing biodiversity loss, and still losing forested lands despite repeated attempts to do so? Why does it appear to take so long to achieve so little? Many academic, political, and other observers might ask themselves these questions. If these were not long-term environmental policy challenges, they would, most likely, already be "solved" or very substantial headway would have been made in desirable directions. By and large, the inability to easily make rapid progress is linked to the very nature of long-term environmental policy challenges which I will address in this chapter. While I will demonstrate the appreciable challenges, I remain optimistic that, with more advanced research, political innovators and entrepreneurship, as well as appropriate resource allocation, there remains substantial scope for avoiding extremely unfortunate environmental outcomes.

After defining long-term environmental policy challenges (Section 22.2), I will review select methods used to study this class of challenges (Section 22.3) before turning to the policy options to cope with them (Section 22.4). The outlook (Section 22.5) is geared toward inspiring future research.

22.2 Definition

Long-term policy (LoPo) challenges set themselves apart from shorter-term challenges. LoPo can be defined as

> public policy issues that last at least one human generation, exhibit deep uncertainty exacerbated by the depth of time, and engender public goods aspects both at the stage of problem generation as well as at the response stage.
>
> *(Sprinz, 2009, 2)*

The definition has three constituent components. First, a "human generation" relates to problems that remain unabated for a quarter century or longer, or, alternatively, to policy interventions that need a quarter century or longer to reach their long-term policy goal. Iteratively "muddling through" (Lindblom, 1959) is very unlikely to solve LoPo challenges. For example,

halting deforestation by 2030, such as agreed at the UN Framework Convention Climate Change's 26th Conference of the Parties (UNFCCC COP-26) at Glasgow in November 2021,[1] echoes the 2014 promise to (a) reduce deforestation by 50% until 2020 and (b) achieve the 2030 goal of halting deforestation.[2] In view of the data on forest loss or recent greenhouse gas emissions, achieving the purported environmental goals appears beyond challenging.[3]

Second, deep uncertainty refers to

> a situation where the system model and the input parameters to the system model are not known or widely agreed on by the stakeholders to the decision.
>
> *(Lempert, 2002, 7309)*

Deep uncertainty represents considerable scientific and/or perceptual uncertainty about where policy interventions (or the lack thereof) may lead to over time. This is particularly aggravated by political and administrative turnover. In particular, a "new" political or administrative leadership may deviate in its expectation about non-intervention or the effects of specific policy interventions from its predecessors even if the scientific knowledge does *not* change. The assessment of climate change by the US Trump administration provides a stark contrast to the preceding Obama administrations and the succeeding Biden administration, although the science of climate change did not fundamentally change during these three governments.

Third, lopo challenges continue to generate intertemporal negative externalities (such as greenhouse gas emissions that remain effective in the atmosphere for decades with ensuing impacts) if unchecked, thus shifting the costs of present-day inaction to future generations. Conversely, the challenge to assemble sufficiently large and effective groups of actors to curb such challenges over time shows that the logic of collective action characterizes LoPo challenges (Olson, 1971). The Great Green Wall[4] is an attempt to stop the further southward advancement of the Sahel desert and to create livelihoods, protect the environment, as well as to further a very broad array of UN sustainability goals across that latitude in Africa. It appears that only a small fraction of the 2030 ambition has yet come to fruition.[5]

Overall, LoPo challenges should be seen as a conundrum similar to "wicked" (Rittel & Webber, 1973) and "super-wicked" (Levin et al., 2012) policy challenges. Levin et al. suggest that

> [s]uper wicked problems comprise four key features: time is running out; those who cause the problem also seek to provide a solution; the central authority needed to address them is weak or non-existent; and irrational discounting occurs that pushes responses into the future.
>
> *(Levin et al., 2012, 124)*

In conjunction with the definition provided earlier, it becomes apparent that not all environmental policy challenges are long term, yet what we call LoPo environmental challenges are far from trivial and may often be associated with policy failure, defined as low effectiveness in coping with them (Helm & Sprinz, 2000; Sprinz & Helm, 1999).

The most vexing challenge associated with LoPo is the challenge of time-consistent decision-making. Kydland and Prescott (1977) raised this issue in their Nobel Prize winning work by showing that optimal policies adopted at one point in time may not be optimal at a later point in time, given political or other perturbations that intervene in the meantime. In the same vein, Elster (2000, 24), quoting Cukierman, defines time or dynamic inconsistency as "when the best policy currently planned for some future period is no longer the best when that period arrives." This also reflects intertemporal discrepancies in preference between governments and

voters on LoPo challenges. The mere possibility of governments (and individuals) reneging on long-term promises, either by way of inconsistency over time in the behavior of the same person (hyperbolic discounting) or due to strategic interaction among various actors (Elster, 2000), led Kydland and Prescott (1977) to call for "rules rather than discretion", that is, rule-based decision-making by a third party (delegation) not subject to constant political pressures.[6] We will turn to this and other policy options following a brief overview of methodological approaches.

22.3 Methods

Methods inform us as to how we can study phenomena. A range of methods lend themselves to the study of LoPo challenges. Given the brevity of this chapter, a complete review of methodologies is not feasible, yet prominent approaches are briefly highlighted,[7] including

- Storytelling, Delphi methods, and foresight exercises;
- Comparative case studies;
- Statistical approaches;
- Game-theoretic models and negotiation simulation;
- Robust decision-making; and
- Agent-based models.

Perhaps the oldest approach in research may be storytelling, yet Delphi methods and foresight exercises have given way to structured exchanges about analyses, expectations, and policy interventions to reduce or even solve long-term environmental policy challenges (Georghiou et al., 2008; Gordon & Helmer, 1964; Lempert et al., 2009, 107). Conceptually, comparative case study designs also lend themselves to LoPo analyses (Bennett, 2004; George & Bennett, 2005), yet they have not been employed rigorously in the context of LoPo, potentially because comparative case studies are mostly employed retrospectively rather than prospectively.

The latter characteristic is also shared by statistical approaches to the study of LoPo (Lempert et al., 2009; Sprinz, 2004), except if they are used for predictions. While econometric forecasting has proven useful for short periods of time, it lacks the ability to cope with structural changes over long periods of time.

By contrast, game-theoretic models help us to understand strategic interaction among stakeholders, especially in a dynamic context under various assumptions about information (e.g., Hovi & Areklett, 2004; Kilgour & Wolinsky-Nahmias, 2004). Besides improving our understanding of strategic choice, game theory's perhaps most pivotal use has been its incorporation into multi-party negotiation software, such as the Predictioneer's Game and the DECIDE models (Bueno de Mesquita, 2009a, 2009b; Dijkstra et al., 2008; Sprinz et al., 2016; Stokman & Van Oosten, 1994). Only rarely have such models, however, been used to make predictions far into the future (for exceptions, see Bueno de Mesquita, 2009a; Bueno de Mesquita et al., 1985; Bueno de Mesquita et al., 1996).

Robust decision-making (RDM) models build on existing simulation models, such as climate, water, or integrated assessment models.

> RDM treats uncertainty with multiple representations of the future, as opposed to a single (probabilistic) forecast, and uses robustness, as opposed to an optimality condition, Thus, … to evaluate alternative strategies that might be pursued by policy-makers … RDM also adopts key concepts from scenario planning.
>
> *(Lempert et al., 2009, 116)*

Grossly simplified, RDM relates near-term interventions to groups of desirable and undesirable long-term outcomes and helps policy-makers to identify strategies whose good performance is relatively insensitive to key uncertainties and to characterize the key tradeoffs among such strategies (Groves & Lempert, 2007; Lempert et al., 2009, 116; Lempert et al., 2003).

Similar to the simulation models used by RDM modelers, agent-based models allow for a wide plethora of structured "what if" questions to be computed in efficient ways, for example, the coalition formation process for greenhouse-gas-emission-reducing "climate clubs" or the assessment of the usefulness of the architecture of the 2015 Paris Agreement on Climate Change to hold global mean temperature change since the onset of industrialization below 2 °C (Dimitrov et al., 2019; Hovi et al., 2019, 2020; Sælen, 2020; Sælen et al., 2020; Sprinz et al., 2018).

Overall, scholars of long-term policy have a broad range of methods to choose from. Models calibrated with high-quality observed data in combination with a structured approach to explicitly treat uncertainty are likely to be most useful for practical applications.

22.4 Policy Options

While non-environmental fields, such as the quest for democratic accountability, the rule of law, and humanitarian law, provide a rich history for LoPo challenges, the environmental LoPo challenges are largely, but not exclusively, a post–World War II phenomena. Much has been written about relevant policies available in the abstract sense (Ascher, 2009; Hovi et al., 2005, 2009; Sprinz, 2005, 2009, 2012, 2014; Sprinz & von Bünau, 2013) and, very prominently, in the context of democratic rule (Boston, 2017, 2021) and reforming pension systems (Jacobs, 2008, 2011). To keep it traceable, I have grouped a range of prominent policy proposals into the categories of

- Institutional design;
- Information;
- Dis/incentives; and
- Direct regulation and enforcement.

What follows is open to future refinement. I will briefly cover each of these four groups; the merits of their usefulness will most likely vary across specific LoPo challenges. I invite readers to think about an abstract menu from which to choose from, given the challenges at hand and the paucity of the literature on long-term policymaking.

Designing and redesigning institutions is the work of constitutionalists and politicians, the core of statecraft, but also the nexus between those who govern and those who choose who governs on their behalf. The old adage still holds that if a scandal occurs or a government does not know what to do, a commission is appointed. In nearly all cases, proposals are made to design new or strengthen existing formal institutions or, sometimes, to close institutions that have exceeded their (past) usefulness. Elections in select democracies more recently highlight the importance of environmental LoPo challenges as governmental priorities. It is not far-fetched to anticipate that future election results may be influenced more strongly by electoral sentiment on environmental LoPo issues. With a view to give more weight to those most effected by decisions, various proposals suggest strengthening the representation and influence of younger and future generations, including lowering the age for eligibility to vote, additional votes for parents (to be executed on behalf of their children), and the creation of particular youth councils. While each of these proposals ought to strengthen the rights of future generations and to ameliorate LoPo environmental challenges, more broadly based representation does not automatically imply more effective, long-term solutions.

Table 22.1 Policy options

Category	Policy option	Example(s)
Institutional Design	Create new or strengthen existing institutions	Hearings, commissions
Institutional Design	Electoral accountability and potentially delegate more weight to younger generations	Lower minimum age for eligibility to vote, additional votes for parents
Institutional Design	Nest intermediate goals within long-term goals	Short-, medium-, and long-term goals
Institutional Design	Delegation of authority	Carbon emissions and/or removals bank
Institutional Design and Information	Eliminate alternative options	Reduce choice set, construction of long-term infrastructures
Information	Transparency	Advisory councils, youth or intergenerational councils, labeling
Information	Rational ignorance: collecting no new information	Exit polluting sector, time limits for decisions
Dis-/incentives	Government fiscal policy	Subsidies and financial offlifting to taxpayers, taxes
Dis-/incentives	Compensation and sanctions	Compensation for past, present, and potentially future damages, penalties
Regulation and Enforcement	Government regulation and enforcement	Emission permits, prohibition of polluting activities

Two additional institutional design options appear helpful: nesting short- and medium-term performance benchmarks within long-term goals and delegating authority. Nesting goals across time allows the (s)electorate (Bueno de Mesquita et al., 2003) to more clearly check progress over time and diagnose overcompliance as well as undercompliance. Introducing climate-related emission reduction goals for 2030 as part of a long-term climate neutrality goal by, for example, the year 2050, is such a practical performance standard. Missing such intermediate goals is the purview of the non-compliance literature, both domestically and internationally. Perhaps most important is to realize that democratic and other institutions suffer from much "presentist bias" (Boston, 2017), and delegation to technocratic institutions is advised, much as originally formulated by Kydland and Prescott who suggested over four decades ago:

> The implication of our analysis is that policymakers should follow rules rather than have discretion. The reason that they should not have discretion is not that they are stupid or evil but, rather, that discretion implies selecting the decision which is best, given the current situation. … There could be institutional arrangements which make it a difficult and time-consuming process to change the policy rules in all but emergency situations.
>
> *(Kydland & Prescott, 1977, 477–487)*

Suggestions for an "energy agency" (Helm et al., 2003) or a carbon emissions (and/or removals) bank that handles carbon emissions (and/or removals) is one prominent option, given the failure of many (yet not all) governments to reduce absolute greenhouse gas emissions since 1992. Finally, one institutional design option may cross over to the informational category: the elimination of options. A prominent example is the debate about the phaseout of the coal-based electricity sector. Once concluded (i.e., coal-based power plants disassembled), this may be difficult to revert

to due to the high infrastructural costs of a renewed buildup as well as the competitiveness of scaled-up renewable energy. Constitutional court decisions may serve the same function, assuming observance of the rule of law. Infrastructures built in one location are the strongest way to reduce choice sets: it is often extremely difficult to repurpose the same location for other policy options. More generally, high fixed costs make it difficult to initiate long-term strategies, yet also difficult to revert policy exits once decommissioning high fixed cost policies is under way. Eliminating endless searches for even better options, often a surrogate for procrastination in the absence of supermajorities in favor of policy resolution, brings us closer to the informational category.

Improving the informational basis for more suitable decisions[8] is the classical purview of advisory councils and information agencies, such as the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), or, at the national level, the German Advisory Council on Global Change (WBGU), national councils on environmental quality, or the European Environment Agency (EEA). In addition, youth or intergenerational councils and the courts may lengthen the time horizon and solutions space to be presented to institutions that take final decisions. The ultimate challenge for such institutions is that words may be fruitful, yet "action speaks louder than words." Most of the time, informational institutions are separate from decision-making institutions, and the appetite for science-based policies, in the stricter LoPo sense, appears, as of now, to be limited. Yet without the strength of informational institutions, we should not expect decision-making bodies to be sufficiently informed about the LoPo aspects of environmental decisions. After "endless" searches it may, however, be rational to simply stop searching and to take a decision, for example, to exit a polluting sector, such as coal for electricity – unless an emergency arises before completely decommissioning these infrastructures.

Financial resources are often helpful, if not transformative, conditional on their availability and the appropriation to LoPo rather than short-term policy challenges. Restructuring the coal sector in several countries will be contingent on partial or complete buy-outs of constituents in these sectors. This "sugar daddy" solution, is, however, not available for all LoPo environmental challenges most of the time (Sprinz, 2008). Using taxes on pollutants belongs to the repertoire of economists. Contested at the international environmental level, yet standard at the domestic policy level, compensation for environmental damages is an option for challenges not mitigated and where adaptation proves insufficient. The same holds for penalties. Direct regulation and enforcement of the law are also possible, for example offering the right to migration for otherwise inundated countries as the result of sea-level rise or directly regulating a polluting industry (Sprinz & von Bünau, 2013; Verheyen & Roderick, 2008). Overall, this list of policy options is not exhaustive, yet should capture many important levers to limit environmental LoPo challenges.

22.5 Future Research

LoPo challenges are enduring challenges, and perhaps surprisingly a general (rather than single-issue) literature is in short supply. Selectively building on Sprinz (2009), I sketch a range of general challenges that academic research as well as research by practitioners should be devoted to.

First, democratic politics is fundamentally about (re-)elections and who gains office with which policy priorities. Given that LoPo challenges cannot be solved within one electoral period by definition (see Section 22.2), any LoPo policy undertaken in period 1 will not yet be able to demonstrate whether it is fruitful at the end of that period, thus no clear signal can be sent to the electorate in time for the election at the end of the first electoral period.

This begs the question of rewards for LoPo in the presence of competing short-term policy challenges and the challenge as to whether LoPo is continued in period 2 by the same or a newly formed government. This challenge applies to the environmental and non-environmental fields alike, especially given the longevity of and slow reaction to typical environmental LoPo challenges (e.g. the inertia of the climate system, recovery of overfished stocks, reversal of land degradation). More research should be directed at how long-term constituencies for LoPo (Lempert, 2007) can be created. The influence that Fridays for Future is trying to exert on politicians and other stakeholders is one prominent example thereof.

Second, can we predict environmental LoPo policymaking? As we have seen above (see Section 22.3), this should be feasible, yet we witness comparatively little such effort. By contrast, much normative argumentation of the need for environmental LoPo can be found, yet credible LoPo in action has been in short supply. The use of policy prediction models should be explored in depth, for example on the implementation of net zero greenhouse gas emission goals, their timing, intermediate goals, and the revisions thereof (see above), but also on whether and when overfished areas will (not) be reopened for harvest, and by which time stringent policies to build net carbon sinks will be pursued so as to add credibility to net zero climate emissions goals.

Third, assessing the effectiveness of LoPo, that is, the causal effect of policy decisions on LoPo, should be undertaken, bearing in mind that causal attribution over time will prove challenging as well as rewarding.

Fourth, the study of global and sub-global environmental policies has galvanized a lot of research capacity over the past decades, including research on multi-level environmental governance. Given Putnam's (1988) dictum of two-level games about the nexus of international and domestic (environmental) policies, it would be particularly fruitful to undertake *systematic* research on LoPo two-level challenges. This applies especially to the class of global environmental challenges (such as climate change, land degradation, biodiversity) but also to decision-making in supranational institutions, such as the EU.

Fifth, turning the time inconsistency challenge into a research question: Which policy tools prove most successful in avoiding delayed starts? While this partially overlaps with previous suggestions, here the lenses magnify less the "whether" than the "when" aspect. Much like the pursuit of robust decision-making (see above) focuses on the choice of short-term action with least regret about future outcomes, we know too little as to when and under which circumstances such policies commence.

Long-term environmental policy challenges are particularly difficult challenges, both in need of much more comparative as well as methodologically refined research. Unlike short-term environmental policies, there is no "end" in sight – as they are likely to be perennial and wicked challenges demanding our attention, research, wit, and dedication to keep them in check, if not to solve them.

Box 22.1   Chapter Summary

- By definition, LoPo challenges are difficult to solve.
- A broad range of social science methods is suitable for the study of LoPo.
- Policy options to cope with LoPo encompass institutional design, information, dis-/incentives, as well as regulation and enforcement.
- Predicting LoPo choices, coping with time inconsistency, and assessing the effectiveness of LoPo policies are among three challenges that merit dedicated future LoPo research.

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Notes

1 https://unfccc.int/news/cop26-pivotal-progress-made-on-sustainable-forest-management-and-conservation (last accessed: 23 April 2023).
2 https://forestdeclaration.org/about/ (last accessed: 23 April 2023).
3 https://www.globalforestwatch.org/blog/data-and-research/global-tree-cover-loss-data-2021/ (last accessed: 22 October 2022).
4 https://www.greatgreenwall.org/about-great-green-wall (last accessed: 23 April 2023). While ambitions for 2030 are clearly stated, the overall degree of *relative* progress to achievement has not been assessed for the period since inception.
5 https://www.greatgreenwall.org/results (last accessed: 22 October 2022).
6 Creating and maintaining such independent, rule-based institutions is itself a credible commitment challenge.
7 For a more detailed, select treatment of methods, see Lempert et al. (2009) and Sprinz & Wolinsky-Nahmias (2004).
8 Jacobs (2016) provides insightful reviews and especially suggestions as to how informational status might impinge on LoPo decisions. Here, I focus merely on institutional forms observable in the environmental policy field.

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