Learning About Climate Change

International Institute for Applied Systems Analysis (IIASA)
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It is by now widely recognized that uncertainty is a necessary component of any analysis, discussion, or decision related to the climate change issue. Emissions scenarios are typically presented as sets of many alternative outcomes rather than single forecasts; climate projections increasingly take the form of ensembles of results from multiple models or from multiple runs of a single model; the development of probabilistic characterizations of the future is becoming more and more common; impact assessments grapple with how to manage the uncertainty in climate outcomes; and accounting for uncertainty permeates policy discourse on whether to take action and if so when, what kind, and how much.

Much less widely appreciated is the potential for our current conception of the uncertainty associated with the climate change issue to change over time. How fast and in what way uncertainty might change – and what the implications may be for today's decisions – is only beginning to be explored. Much of the work on climate change and learning (defined here as the acquisition of new information that leads to changes in uncertainty) has focused on developing and analyzing theoretical models to define the possible effects of learning on optimal decisions, and the conditions which lead to those effects. Most such studies have focused on the problem of optimal timing of emissions reductions. While such analyses are obviously essential, by themselves they fall short of providing satisfactory policy guidance. Typically, the effect of learning on optimal decisions is ambiguous. Accounting for the fact that we will learn over time can imply that we are better off undertaking more mitigation now, or less, or it might make no difference at all. The conclusion depends on empirical factors: what aspect of the climate problem it is assumed will be learned about, how much and how fast learning will occur, and what the nature of the learning will be – will we acquire new information that makes things more uncertain, or less?

Another area of focus in research on learning has been to attempt to simulate realistically what kind of learning might actually take place over the coming decades and what it might imply for today's decisions. The potential for technological learning has received the most attention, but learning about the physical climate system and about socio-economic processes such as population growth have begun to be investigated as well. Such studies are important because any practical conclusions to be drawn from learning studies must take into account how much and how fast we think we really might learn about different aspects of the problem.

A third set of studies employ alternative frameworks relative to earlier work. For example, rather than examining how learning would affect the decisions of a social planner regarding optimal timing of emissions reductions, these analyses examine the possible effects on the stability of international agreements, or on adaptation decisions of individual agents. Or, they retain the social planner, but investigate the influence of other aspects of the problem structure such as the decision criterion. These analyses emphasize the fact that learning has implications for decisions well beyond the optimal timing of global emissions reductions.

Finally, it must be recognized that learning is an issue that is not by any means unique to climate change. There is a rich record of past experience with how new information has changed the uncertainty in future outlooks for a number of other issues. There are also several non-climate-related fields in which models in current use account for the possibility of future learning.

This meeting will aim to bring together a small group of researchers from within and outside of the climate change field to present and discuss recent work on learning. The goal will be to stimulate new ideas and thinking on approaches to incorporating the potential for learning into climate change analyses of various types, and to that end the meeting will address the topic from a number of angles:

- Lessons from the past: Forecasts of energy use, population, and ozone depletion have a long history and offer insight into how and why outlooks for the future change.
- Alternative approaches to the analysis of learning: Analyses from other fields and analyses with different methodological approaches.
- Simulating future learning: How might learning realistically proceed about particular elements of the climate issue such as population, emissions, the carbon cycle, and climate sensitivity?
- Integrated analyses: What are the implications of learning for policy in analyses that integrate simulations of learning within a decision analysis framework?

Format:

The meeting will be held over 2 days. Each day will consist of four sessions, loosely organized around the four "angles" described above: lessons from the past, alternative approaches, simulating learning, and integrated analyses with policy implications (with, of course, overlap across sessions, given the nature of the issue). Each session will consist of two 25-minute talks, followed by a 25-minute discussion period. Chairs will be asked to act as informal discussants as well. I.e., they will be the first ones to have the floor in the discussion period to make comments and to ask one or two initial questions. The aim here will be to stimulate discussion on the relevance of specific talks (some of which will not be on climate change at all) to the broader climate change issue.