



PBL Netherlands Environmental
Assessment Agency

Integrated assessments for environmental policy in the ‘post-truth’ society

Synthesis report of a seminar organized by PBL Netherlands Environmental
Assessment Agency and The Integrated Assessment Society, 6-7 October 2022

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January 2023

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The Hague, 2023
PBL publication number: 5156

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Acknowledgements
We would like to thank the speakers and all participants for their contributions to this seminar.

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Integrated assessments for environmental policy in the ‘post-truth’ society

Note to the reader

This seminar report was written for practitioners of Integrated Environment Assessment (IEA): those who commission, design, participate in, compile, use and critique IEA. Likely, lessons emerging from this seminar are also useful for thematic – as opposed to ‘integrated’ – work in science and policy advice. Obviously, the topic of IEA in relation to knowledge contestation and post-truth is evolving as we speak. The seminar was meant to reflect on this topic on the basis of theory and practice, and to identify promising strands of work to address it. It was held under modified ‘Chatham House’ rules, meaning that only statements made as part of prepared presentations can be quoted and attributed. This report combines some preparatory material, a selection of take-home messages from presentations and discussion, and reflections by the report authors.

Introduction

It is now almost a cliché to refer to a ‘knowledge crisis’ in environmental policy and sustainability governance with regard to contested facts and evidence. But knowledge controversies are timeless. Consider for example Socrates, whose critical ideas about Athenian society and democracy ultimately led to the death penalty for him; Galileo Galilei, whose ideas about the universe brought him in conflict with the Catholic Church; and Einstein, whose theory of relativity was initially strongly opposed. But being critical and reflective should be part of science itself, so knowledge claims should, arguably, always be (con)tested.

There is a sense that today’s knowledge controversies are somewhat special. This has to do with some of their characteristics:

1. The so-called ‘post-truth society’ has recently emerged, supposedly characterized by increasing polarization around scientific claims and by the increasing prevalence of personal beliefs over data, facts and evidence.
2. Current environmental issues – like climate change, land degradation and biodiversity loss – are defined as so-called ‘wicked problems’, characterized by high complexity and long-term uncertainty, which can be modelled and estimated, but hardly measured in detail.
3. At the same time, the increasing demand for ‘evidence-based policy’ in current society pushes for clear and certain results, which the sciences can often not deliver.

As a consequence of these characteristics, knowledge seems ever more contested. Consider for example the ‘alternative facts’ around Covid-19, the denial of the nitrogen problem in the

Netherlands by part of the Dutch population and the controversy around biomass as a sustainable source for energy production.

Although this situation of contested knowledge is now widely recognized, the question for those in the assessment business is what it means for practices associated with integrated assessments. This document presents the outcomes of the seminar that PBL Netherlands Environmental Assessment Agency (henceforth PBL) and The Integrated Assessment Society (TIAS) organized in October 2022 to explore this question. The aim of the seminar was to examine the causes of this ‘crisis’ and discuss ways to deal with it in organizations at the interface of science, policy and society. It thus provided a platform for participants to better understand the knowledge controversies within their field and to exchange strategies to cope with those in various stages of contestation and even escalation. Thinking about appropriate responses is all the more important because research has shown that the first ‘natural’ response of scientists – namely, to bring more facts and findings to the table in order to counteract contestation – generally does not work well. So we need to search for alternative strategies that are likely to be more effective.

The full program of the seminar can be found in the annex of this report,. The report identifies a number of relevant concerns and solutions that were discussed during the two days. It also presents a number of take-home messages selected by the organizers. But first we briefly elaborate on what integrated assessments are all about.

What are integrated assessments

Integrated Assessment is the scientific ‘meta-discipline’ that integrates knowledge about a problem domain and makes it available for societal learning and decision-making processes. Scientific and stakeholder knowledge is drawn from many disciplines and a wide range of methods is applied. Public policy issues involving long-range and long-term environmental management are where the roots of integrated assessment on environment and sustainable development can be found. However, today, integrated assessment is used to frame, study and address other issues at other scales (i.e. local, regional, global). The field of integrated assessment engages stakeholders and scientists, often drawing from many disciplines, as well as policymakers. (see also <https://www.tias-web.info/>). For the purpose of this seminar, ‘Integrated Assessment’ and ‘Integrated Environmental Assessment’ (IEA) are used interchangeably.

Integrated environmental assessment (IEA) thus includes applications of scientific knowledge and know-how. But notwithstanding important scientific inputs, its practice typically feels more like a craft, or an art, than a science. Examples of integrated environmental assessments are worldwide assessments like those of IPCC and IPBES, Global Environment Outlook, as well as the multitude of local spin-offs of these and national sustainable development reports. A large part of PBL’s work also fits the bill. Moreover, regulatory assessment of policy initiatives, such as strategic environmental assessments, and the EU’s system of Impact Assessment, have developed characteristics that result in overlap with IEA in some jurisdictions: broad scope, forward-looking, supportive of deliberation and with follow-up monitoring.

Environmental assessments traditionally comprise much quantification, and this often involves models. Contestation of environmental assessments is often phrased in terms of distrust or critique of the computational models involved. In the seminar several examples and opinions were

provided in this vein. However, integrated environmental assessments are typically based on a wide array of methods and tools including much more than models and quantitative methods only. In fact, one of the developments of organizations such as PBL since the early days of integrated assessment, thirty years ago, has been to employ an increasingly wide repertoire of knowledge tools. Modern integrated assessments draw on more than biophysical and economic expertise. IA's rely on urban development approaches, sector-oriented expertise, mixed methods and juridical and policy sciences.

The post-truth society

One of the core themes of the seminar was the question of what this 'post-truth society' – that the title speaks of – actually is. Here, the seminar aimed to go beyond diagnoses in which facts and 'the truth' have simply become irrelevant (with Trump or Bolsonaro as purported icons). Such diagnoses are overly simplistic, as illustrated for instance by surveys showing robust trust in science, both in the Netherlands and elsewhere (Rathenau Instituut 2022; Gundersen et al. 2022). Rather, the seminar tried to understand what it means when scientific truth claims are not necessarily taken at face value in the public debate. Noortje Marres' keynote speech, titled "Why we still can't have our facts back", distinguished between 'contested' and 'contentious' knowledge. Whereas contested knowledge refers to disagreement about a particular truth claim (i.e. different perspectives, disciplines, or communities having a different interpretation or opinion of that specific truth claim), contentious knowledge refers to a situation in which the contemporary scientific knowledge culture *itself* is being challenged. Rather than a situation in which scientific experts can deal with issues of uncertainty and complexity in isolation, contentious knowledge calls for engaging diverse publics with different forms of knowledge – scientific, professional, practical, indigenous. These diverse publics may hold different views on what questions are relevant and what knowledge can address them.

So what causes this supposed shift to contentious knowledge? One answer is that there is a general increase in public suspicion towards elites and vested interests, and that this suspicion extends to scientific communities. Another, more productive answer, is found in the work of critical scholars of science and technology studies. They argue that because facts and values can never be neatly separated, lamenting or trying to undo this shift is misguided (Jasanoff & Simmet 2017; Marres 2018). Rather, we should learn to 'embrace' this shift and put our efforts into making it a productive one (Fuller 2016, 2017). An example, not discussed at the seminar, of what this can mean is Castree et al.'s (2020) proposal for 'Global Environmental Assessments 3.0', which deliberately and explicitly tries to advance political reasoning and normative debate. This the authors argue, would eliminate the need for retaining the fact-value distinction while still allowing autonomous assessors to contribute to a worldwide conversation about desirable futures.

Some strategies to deal with contested/contentious knowledge

In terms of knowledge controversies, IEA's seem not be particularly subject to contestation – not more than, for example, other types of scientific reports or policy monitoring and evaluations. Some sentiments can nonetheless be detected against large and established processes, like IPCC,

and huge and vested reports, like Global Environment Outlook (GEO). But, for example, PBL's biannual *Assessment of the Human Environment (Balans voor de Leefomgeving)* is generally well received by Ministries, the media and interest groups. By and large, IEA processes and reports lend themselves well to: (i) applying a broad repertoire of knowledge tools, (ii) acknowledging alternative perspectives and (iii) informing the user of limitations of the findings. This generally helps to increase the trustworthiness of the work.

During the seminar, several strategies to cope with contestations were addressed in two rounds of workshops. The first round focused on vested strategies, the second one on more innovative strategies:

1. A initial strategy, that fits very well with "Bringing more and more facts to the table in case of contestation" is 'extreme vetting'. This is what we for example can observe in the production of IPCC assessments: massive processes of peer review and government review of draft reports with the purpose of laying any controversies about the scientific assessment to rest before a Conference of Parties debates its policy response. By contrast, the workshop reminded the participants of the useful practice of 'robustness analysis' in IEAs. This works in a completely different way. It checks whether key conclusions would have been different, and in what way, if the assessment had made use of different models, indicators, reference years, and so on. The result is a concise statement by the assessment team as part of their reporting.
2. Another strategy is to educate policy makers and the public at large on how to effectively interrogate model-based evidence, such as the European Community's impact assessments. Focus questions are: What data are used, and where do they come from? What are the assumptions, including important ones embedded in the model or models? And, crucially: can the evidence bear the weight of the conclusions, also considering the decisions that it feeds and the consequences thereof? If these questions are properly addressed, by users or by those who commission or carry out these assessments, then some distrust in models may be reduced.
3. A third strategy is the inclusion of a broad(er) range of societal perspectives of an environmental issue in an assessment project. An example that was discussed in one of the workshops was 'the biomass report' of PBL from 2020, and in particular its joint fact-finding (*Beschikbaarheid en toepassingsmogelijkheden van duurzame biomassa - Verslag van een zoektocht naar gedeelde feiten en opvattingen*). Stakeholder consultations provided key input. The resulting report provides an overview of the variety of issue frames and viewpoints on biomass use, especially energy use. The views were extremely diverse and ranged from supportive to opposing. All factions mobilized scientific knowledge, but from different disciplines and/or with different interpretations, associated with divergent societal values.

As a second example of this third strategy, technology assessments for the German Bundestag were presented. Routinely, emerging technologies are reported on. Topics range from editing of the human genome to wind parks at sea and from urban timber construction to autonomous weapons systems. These assessment reports present a factual description of the matter on the one hand and, separately, societal perspectives on the other. Unlike the PBL example, research for these assessments is desk research, with ICT-mediated systematic reviews of scientific literature and general media as input (<https://www.tab-beim-bundestag.de/> and TIAS, 2020).

The idea, for cases like these two, is that by illuminating the variety of societal perspectives the assessment does a better job in informing public discourse and, eventually, policy. Both examples benefited from focused questions by the target audience and from a well-organized and easily accessible knowledge base.

The seminar considered these three strategies – extreme vetting, educating the public and multi-perspectivism – as ‘currently applied approaches’, although this does not mean that these are always used in every situation. In a second round of workshops, three more recent strategies were addressed:

4. One workshop initiated a dialogue between assessment practitioners and artists. In an experiment, participants were challenged to visualize one of the scenarios used in the latest IPCC Assessment Report from the perspective of a specific interest group. The idea behind this approach is that science has to team up with creative thinkers and doers outside the classical domain of science in order to find new ‘non-lingual channels’ to better connect to the larger public. And not only to explain what IEA is all about, but also to really open up black boxes, so that audiences can critically respond to science.
5. Another innovative strategy is to have IEAs occasionally focus not on the environmental issues at hand but on the underlying societal discomfort. The case presented concerns the conundrum of innovating conventional agriculture in The Netherlands. Thus, rather than once again detailing the multitude of environmental problems caused by the sector (intensive husbandry, in particular), a sector-oriented assessment provided a comprehensive analysis of the predicament of Dutch farmers producing bulk food. They find themselves in a catch-22: (i) the obligation to produce in the context of world market prices and, at the same time (ii) do so in an arena that has no room to cheaply accommodate the amount of environmental pressures involved. Sketching this situation, the not-so laudable role of the government, and the difficulty for an individual agricultural entrepreneur to escape from the situation of course does not resolve the problem. However, it does point to a sizeable government agenda item. It also provides the vocabulary for showing empathy with people involved, as part of the necessary discussions.
6. Finally, overlapping somewhat with the case of educating users to interrogate assessments (#2, above), an important strategy focuses on renewing modes of communicating IEA findings. It reminds us of the insight that bringing more facts and findings to the table does not reduce contestation. This strategy seeks modes of science communication that do not aim to transfer findings in a linear and one-directional way, but which help actors in science, policy and society understand their respective positions. For IEA makers, an important implication of this strategy is that it changes when their communication activities take place. It does so not just at the end – when the assessment is finished and the findings available – but rather continuously, in order to be able to integrate the improved understanding of other actors into the assessment.

A good part of the discussions addressed computational models

The basis of modern IEA is much broader than computational models. But – as demonstrated in the seminar – models are often the object of critique, or distrust. This is understandable, considering that a model is often the scientific shop sign of an assessment team, while at the same time being a black box for outsiders. In addition, because a model is by definition a stylized, simplified representation of reality, it rarely applies in an individual case for an individual stakeholder. In other words, models – computational or other – perfectly symbolize the wider challenge for the makers of IEAs to bring together the insights of the systems' world and the reality of the living environment of people.

The practice of IEA is about delivering assessment processes and reports. Typically, it is not about delivering any of the models used. Consequently, the right place for dealing with limitations is the assessment itself. That would be limitations, and bias, coming from models and from other inputs, tools and analytical frameworks used. These limitations should be considered in view of the purpose of the assessment – in some cases, one particular aspect is very important and in other cases it does not matter. Ideally, model-related limitations should be taken on board in the design of the assessment – for example, through ensemble modelling, applying a coordinated array of alternative models – and by choosing the proper level of detail in reporting. And by addressing, head-on, the robustness of the assessment's key conclusions in light of limitations in the models used. Would the conclusions likely have been different, and in what sense, if the assessment had applied different models, indicators, base year or resolution?

In this respect, the seminar highlighted that the transparency of models in themselves has seen a good deal of useful work in the past few decades, although this could definitely be expanded and improved. For example, the EU-sponsored ADVANCE project, established a good documentation standard for description and characterization of climate 'integrated assessment' models. Likewise, the JRC Competence Centre on Modelling maintains the MIDAS database for all models that have been used in preparing Impact Assessments for the European Commission. This kind of documentation describes a model's basis, purpose, design principles, examples of application, etcetera. Discussions in the margin of the seminar also highlighted the needs of a very specific community that wants access – and easy access – at a much deeper level, namely to a computational model's individual equations. Finally, in some situations, a model is routinely applied as a regulatory tool, for example to inform decisions on a permit. Interested parties wanting to contest such a decision in court would benefit from an unambiguous statement of the model's intended scope of application and perhaps even a statement giving examples of what it is not to be used for. This is definitely outside the domain of integrated assessment.

Sondoss El Sawah, of the [University of New South Wales](#), presented work on the *grand challenges of socio-environmental modelling*. One of these challenges is how to better represent the human dimension. Current work focuses on a library of webinars and recorded presentations, aimed at practitioners. El Sawah encouraged participants to join this effort (which is led by the (US) National Socio-Environmental Synthesis Center (SESYNC), [The Integrated Assessment Society](#) (TIAS) and the journal, [Socio-Environmental Systems Modelling](#) (SESMO) (see El Sawah et al. 2020)). She also reminded participants of Saltelli et al.'s (2020) recent manifesto in *Nature*, on good practice in modelling for policy support. On this subject, the European Union's Joint Research Centre's

Competence Centre on Modelling also hosts biennial conferences. Issues of scale figure in almost all of these discourses, as does the need for modesty on behalf of the modeler, and the need to acknowledge limitations and bias while moving forward.

The context: the science-policy interface

Having established that the kinds of controversies the seminar focuses on cannot be resolved merely in the scientific realm, the question now turns to how to resolve them in the interplay of science, policy and society. Here, at least three lines of reasoning can be discerned. A first recognizes the real-world effects that modelling and IA have, and tries to create safeguards that shield society from adverse effects and undesirable excesses. This could, as suggested by Pieter Omtzigt in his keynote, involve for instance publications containing a formal disclaimer about their limitations, and (un)suitability for use in specific situations. Very specifically, this would provide citizens and interest groups greater ability to contest alleged misuse of computational models, for instance in cases court where a model is directly but inappropriately used as a basis for issuing or withholding permits.

A second line of reasoning begins by questioning the idea that science-policy-society relations are often seen to be effective when they share the same frame of an IEA (see also Turnhout et al. 2014). This however limits consideration and inclusion of other perspectives, which is of great importance in pluralist societies. This line of reasoning also suggests that rather than attempting to 'integrate' all perspectives into a single assessment, perhaps the objective should be to promote 'disintegrated assessments'. Such disintegrated assessments would aim for the co-existence of perspectives rather than seeking to integrate them, which could serve to more evenly empower diverse perspectives (see also Maas et al. 2021).

A third line of reasoning approaches the question by focusing directly on engagements between science, policy and society. Upending traditional approaches to science communication, which often focus on 'translating' complex science to 'easy to understand' and clear-cut messages, the emphasis now turns to how to enrich existing public discussions. This results in a focus on dialogue between science, policy and society. Interactions between the three should embrace and acknowledge uncertainty and ambiguity, be honest about the limits to one's expertise, as well as accept conflicting narratives. In this way, the engagement becomes not about reaching agreement on facts, but about understanding the origins of the disagreement.

Some participants expressed the opinion that knowledge organizations are left to deal with communication tasks that used to be covered by policy makers. This may be the case in some situations and not in others. Discussions generally emphasized the importance of identifying the right questions to report on. The circumstance that organisations such as PBL are entrusted to formulate the precise subject matter of its reporting – attempting to address 'the question behind the question' – was recognized as a precious prerogative, and at the same time a big responsibility. PBL DG Hans Mommaas emphasized the importance of context, deliberation and of highlighting trade-offs.

Take-home messages for practitioners of integrated environmental assessment

Given the contents of the seminar as described, in the opinion of the authors of this synthesis report the following take-home messages are relevant:

1. The 'post-truth society' should be put into perspective. Trust in science as an institution is still high among the public at large.
2. Nonetheless, science is increasingly challenged as a system as such (*contentious* knowledge), besides that singular issues are being contested (*contested* knowledge)
3. In terms of knowledge controversies, IEA appears not to be particularly subject to contestation – not more than other types of scientific reports or policy monitoring and evaluations.
4. The scientist's first 'natural' response to contestation – namely, to bring more facts and findings to the table – generally does not work well. Most controversies are not about facts, but about framings, mutual misunderstandings, lack of transparency, mistrust, uncertainties, values, emotions, interests, attitudes, relations, etc. in the interfaces of science, policy and society.
5. Fortunately, various other strategies do exist that may mitigate knowledge controversies, or reduce their severity, and these are also practiced:
 - a) Make your assessments more robust by running them several times based on different models, indicators, timelines, etc. (if time and money allow).
 - b) Open up the 'black boxes' of assessments by making the data used, the data gaps, the model assumptions, the knowledge uncertainties and the limitations for their uses as transparent as possible.
 - c) Help policy makers and the public at large to ask the right questions to scientists to deliver such transparency.
 - d) Address more than one societal perspective in assessments, so that more sectors of society feel represented in our work.
 - e) Include societal discomfort in IEA, so that the social problems behind environmental ones are tabled. This also conveys more empathy to those who experience the social trade-offs of environmental problem solving.
 - f) Be more creative in sharing assessment results. One can think of engaging artists and/or lay people in IEA.
 - g) The classic science communication in one direction does not work anymore; it is better to engage in public discourses on the environmental issues at hand, in which science is one of several parties involved in societal sensemaking.
 - h) Be responsive to substantive criticism and be humble in your interaction with stakeholders.

The obvious starting point for putting these strategies into practice is within organizations that operate on the interface of science and policy and deploy IEA – PBL, for example. After all, the resources and forms of expertise they have available right now may enable or constrain their ability to implement them. Moreover, they will have to find a balance between innovating their practices to stay fit for purpose on the one hand, and on the other hand avoid unwittingly discontinuing other activities only to realize their importance once they are lost. Determining and achieving that

balance will likely require a continuous engagement with stakeholders in science, policy and society.

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Appendix: Seminar programme

Integrated Assessments for Environmental Policy in a 'Post-Truth' Society, 6 & 7 October 2022, The Hague and online

Day 1 (October 6)

- Keynote lectures by:
 - Noortje Marres (University of Warwick): Scientists' and experts' discomfort with the post-truth society and contested knowledge: how NOT to deal with it. 'Why we can't have our facts back'
 - Hans Mommaas (director PBL Netherlands Environmental Assessment Agency): PBL Environmental Assessment Agency's experiences with and responses to critical audiences: lessons learnt
- Parallel workshops:
 - WS 1: Focus on societal perspectives of the issue, George Wurpel (MSG Strategies)
 - WS 2: Vetting of assessment findings, Esther Turnhout (Twente University)
 - WS 3: Helping audiences to interrogate results, Tracey Brown (Sense About Science)
- Video contribution by: Pedro Jacobi (University of Sao Paulo): Environmental assessments and divergent perspectives
- Roundtable: reflections from the workshops and preview of tomorrow's programme

Day 2 (October 7)

- Video contribution by Sondoss El Sawah (UNSW Canberra): Socio-environment models and their grand challenges
- Keynote lecture by Pieter Omtzigt (Independent Member of Dutch Parliament): Models and politics
- Workshops round 2: promising future practices?
 - WS 4: Models in politics and the politics of modelling: in dialogue with artists, Lisette van Beek (Utrecht University) with Ekaterina Volkova and Julien Thomas
 - WS 5: IA focusing on underlying societal discomfort?, Martijn Vink (PBL)
 - WS 6: New modes of communicating IA findings, Tessa Roedema and Willemine Willems (Vrije Universiteit)
- Round table: identifying promising elements of coping strategies

About the speakers

Prof. Noortje Marres is Professor in Science, Technology and Society in the Centre for Interdisciplinary Methodologies at the University of Warwick.

Prof. Hans Mommaas is Director-General of PBL, and a Professor of Regional Sustainability Governance at the Tilburg Institute for Law and Regional Governance (TiREG) of Tilburg University.

George Wurpel is consultant at MSG Strategies. He supported a PBL *joint fact finding* exercise on sustainable use of biomass between 2019-20.

Prof. Esther Turnhout is chair of Science, Technology and Society at the Section of Science, Technology and Policy Studies (STePS) of the University of Twente. She is an interdisciplinary social scientist with expertise in science and technology studies, environmental studies and political science.

Tracey Brown OBE has been the director of Sense about Science since 2002. Under her leadership, the charity has turned the case for sound science and evidence into popular campaigns to urge scientific thinking among the public and the people who answer to them.

Prof. Pedro Jacobi is Professor of Environmental Science at the University of Sao Paolo.

Dr. Sondoss El Sawah is Associate Professor at UNSW Canberra. Her research focuses on programs on advancing the science and practice of systems thinking, and especially its applications in public policy, engineering, and education.

Dr. Pieter Omtzigt is an independent Member of Dutch Parliament.

Lisette van Beek is a PhD candidate at the Urban Futures Studio at the Copernicus Institute of Sustainable Development, Utrecht University. Her research focuses on how IAMs shape climate imaginaries, supervised by Detlef van Vuuren and Maarten Hajer.

Julien Thomas is an artist and social designer who explores the threshold between the spoken and the unspoken. He develops performative installations and processes in which the dynamics of objects and spaces are jointly explored and discerned through movement, rhythm, sound and voice.

Ekaterina Volkova is an artist and interactive media designer exploring critical making as a response to large-scale political issues. Through her work, she brings together material, visual, and codified strategies to explore issues of democracy, conflict, diaspora and labour.

Dr. Martijn Vink is a senior researcher at PBL, focusing on institutional analysis of nature, nitrogen and agriculture.

Tessa Roedema conducts her PhD research in Science Communication at the Athena Institute of the Vrije Universiteit Amsterdam. Her research interests lie in science communication, public engagement with science, science and technology studies, transdisciplinarity and action-based research.

Dr. Willemine Willems is postdoctoral researcher at the Athena Institute of the Vrije Universiteit Amsterdam.

About the organizers

Prof. Bas Arts is Chief Scientist at PBL and professor of forest governance at Wageningen University.

Jan Bakkes is Vice President of TIAS and retired from PBL Netherlands Assessment Agency.

Timo Maas is a policy researcher at PBL and PhD candidate at Wageningen University. His work focuses on how knowledge and expertise can contribute to ways of policymaking and governance that benefit societal and environmental outcomes.