The Gnat *and* the Bull

Evaluating Regional Climate Outlook Forums

Adapted from “The Gnat and the Bull: Do Climate Outlook Forums Make a Difference?” by **Andrea K. Gerlak** (The University of Arizona), **Simon J. Mason**, **Meaghan Daly**, **Diana Liverman**, **Zack Guido**, **Marta Bruno Soares**, **Catherine Vaughan**, **Chris Knudson**, **Christina Greene**, **James Buizer**, and **Katharine Jacobs**. Published online in *BAMS*, June 2020. For the full, citable article, see [DOI:10.1175/BAMS-D-19-0008.1](https://doi.org/10.1175/BAMS-D-19-0008.1).

Arthur Rackham, 1912

In Aesop’s fable, “The Gnat and the Bull,” a tiny gnat overestimates his importance by presuming that he disturbed a large bull by landing on his horn. However, when the gnat prepares to fly away, apologizing to the bull for the disturbance, the bull replies, “It’s all the same to me. I did not even know you were there.” This fable may hold a useful analogy for the current state of efforts to link scientific climate information with societal decision-making, and frames the question asked in this paper: to what extent are claims about the value of climate services justified?

Climate services are defined by the World Meteorological Organization (WMO) as a “means of providing climate information to assist decision-making in ways that involve appropriate engagement, as an effective access mechanism, and as a response to user needs.” They support climate adaptation, disaster risk reduction, and socioeconomic development programs, frameworks, and policies around the globe. As climate services have evolved into a multibillion-dollar public and private enterprise, it is important to assess their impacts and set appropriate objectives.

In the late 1990s, WMO and other international agencies initiated Regional Climate Outlook Forums (RCOFs) to produce user-relevant climate outlook products and help manage climate risks for large regions of the globe. RCOFs are thus particularly good subjects for assessment, as WMO is increasingly integrating them within its climate services infrastructure.

Strong claims have been made about their positive impacts, ranging from significant reduction in drought and disaster losses, to advances in developing the capacity of scientists and improving awareness and networking among users, to guiding community adaptation to climate change. But many other purported benefits are based on anecdotal information and have not been evaluated independently.

Most RCOFs are centered around producing a “consensus” seasonal, regional forecast for precipitation, temperature, and other climate risks. In addition to capacity building and networking, the ultimate objective is to improve climate risk management and adaptation. RCOFs are also intended to enable producers and users of climate forecasts to interact, enhancing uptake and application. Given the growth of RCOFs, it is time to develop a more intentional and multifaceted approach to their evaluation.

An approach to evaluating the RCOFs

We propose three broad categories for evaluating not just RCOF’s, but possibly also other efforts that connect climate science to decision-making.

The first category—*quality of climate information produced*—focuses on the core goal of developing scientifically credible and skillful climate information—primarily the regional seasonal forecasts, but also the other products RCOFs increasingly create and share.

Thus, the second category—*legitimacy of RCOF processes*—corresponds to the contributing goals of facilitating consensus in a forecast, engaging a broad set of users, and building capacity. Legitimacy in climate services refers to the openness and fairness of knowledge, meaning that the processes incorporate diverse perspectives and all users find the processes beneficial.

The third category—*usability of climate information*—includes aspects that can facilitate the uptake and use of RCOF seasonal fore-

casts. In climate services, usability is widely seen as how the climate information informs policy and decision-making.

Assessing RCOF processes and the perceived usability of RCOF products will require quantitative and qualitative social science sensitive to regional contexts. Ultimately, the evaluation methods should be coproduced, where producers and users of climate services together design the evaluation metrics and processes.

Application of criteria

Even the longest-running RCOFs have generated sample sizes too small for in-depth analyses of their probabilistic seasonal rainfall forecasts, their primary information product. It will likely be necessary to pool forecasts from different seasons and multiple locations. Regardless, it is important to define precisely the objectives of verifying forecasts and identify the specific quality attributes of interest. It is important to evaluate how the forecasts are translated into information that supports decisions, rather than to evaluate the forecasts per se.

In engaging a broad set of users and supporting capacity building, RCOFs address the salience, credibility, and legitimacy of climate information. Yet, indicators of legitimacy cannot be standardized; they are less tangible and more conceptual than forecast quality metrics. Further, RCOF processes differ greatly, including by region, so the evaluation of legitimacy should be tailored accordingly. We suggest that context-sensitive measures of legitimacy should be developed to evaluate the processes of scientific consensus, user engagement, and capacity building. Consistent measures over time would be valuable to observe long-term changes.

Interviews and surveys of climate information producers can be used to evaluate how an RCOF consensus is reached and can also assess whether there are mutually agreed upon and useful standards of what constitutes “credible” and “legitimate” contributions, as well as how these inputs are considered, negotiated, and integrated within the consensus forecast.

The quality of interactions between producers and users of the forecasts should be measured—for example, to indicate whether users build trust and confidence in the infor-

mation and whether participants perceived their voices were heard.

Many national meteorological and hydrological services face key capacity gaps that the RCOF process may help mitigate. RCOFs should evaluate user engagement to determine how scientific and technical information is translated and taken up.

To facilitate use of information, RCOF products must be responsive to users' contexts and needs. RCOFs must undertake stakeholder mapping and needs assessments to determine who potential users are, what kinds of climate information they require, and how best to facilitate their engagement in RCOFs. However, RCOFs inherently prioritize the knowledge of certain institutions and actors over others, potentially leaving out the needs and priorities of those most vulnerable to climate risk. Interdisciplinary assessments are important to frame climate vulnerability as a complex social process, and not only as a product of exposure.

Evaluations that enable understanding of how RCOF forecasts and related products are used can help adjust provision of climate information. RCOFs can then be testbeds in an iterative process of refining and generating products—shifting toward demand-driven, rather than supply-driven, climate services.

Next steps: recalibrating RCOFs?

Coordinated evaluation studies should assess RCOF processes across multiple regions and over time, gathering data across several sources using a variety of assessment methods. WMO and other RCOF funders and organizers should immediately implement sustained evaluation procedures, piloting them at selected RCOFs. The evaluation should help foster coproduction of knowledge, illustrate the value of RCOFs, and contribute toward sustainability of the RCOFs.

Ultimately, however, what may be most important is *how* evaluation is undertaken. The evaluation process itself can be underpinned by coproduction—a coevaluation among producers

Goal Categories

Evaluative Categories

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* **An approach to evaluating the RCOFs, in categories associated with the goals as currently interpreted and implemented by organizers of RCOFs.**

and users of climate information. Coevaluation can place the onus on participants themselves to actively define and realize RCOF goals.

There is a fundamental question as to whether those objectives should be realigned for the current climate services context. We suggest that the place of RCOFs in the climate services system must be better articulated. Decisions around who participates, the design of the RCOFs, and ongoing activities must be aligned with the goals. Evaluating the RCOFs can test our assumptions about goals and may help resolve longstanding tensions around the appropriate scale for user engagement, the role of scientific consensus, and the scale and scope of information needed to support climate adaptation.

Credibility and relevance depend on ensuring continuity between RCOF events, especially to ensure that information is updated and collaboration and interactions continue. It will be crucial to develop more inclusive processes for defining objectives on an ongoing basis and to embrace a more service-oriented culture that empowers users.

The RCOFs must also strategically align with, and effectively build upon, other complementary efforts if they are to ever improve climate risk management and adaptation. If the RCOFs fail to align, they risk becoming like Aesop's gnat, with less impact than is thought within the RCOF community. ●●

▲ * Colleagues at Caribbean Institute for Meteorology and Hydrology in Bridgetown, Barbados: From left to right: Cedric J. Van Meerbeeck (Caribbean Institute for Meteorology and Hydrology), coauthor Diana Liverman (University of Arizona), Roche Mahon (Caribbean Institute for Meteorology and Hydrology), Shelly-Anne Cox (Caribbean Institute for Meteorology and Hydrology), coauthor Christina Greene (University of Arizona), lead author Andrea K. Gerlak (University of Arizona), and Adrian R. Trotman (Caribbean Institute for Meteorology and Hydrology).

BAMS: What would you like readers to learn from this article?

Andrea K. Gerlak (University of Arizona): *As climate services have evolved into a multibillion dollar public and private enterprise, we argue that it is necessary to assess the impacts of climate services and to set objectives to ensure that climate services can be meaningfully designed, implemented, and evaluated. We offer guidance on how to measure the success of RCOFs in meeting their objectives, and propose broad evaluative categories that might be useful to climate service providers, users, and funders, broadly.*

BAMS: Why the focus on this part of that enterprise—the Regional Climate Outlook Forums?

AKG: *RCOFs are long-standing efforts to link climate information and services to decision-making through the production and dissemination of seasonal climate forecasts to improve climate risk management and adaptation. With the increasing challenges associated with climate change around the world, it is imperative that we invest in understanding how climate information is created and used.*

BAMS: How did you become interested in evaluating climate forums?

AKG: *We are a large interdisciplinary team with broad experience in the climate services field. Collectively, we have decades of experience observing, studying, and participating in RCOFs around the world. I became interested*

in these issues several years ago when working with the team of researchers from the University of Arizona and Columbia University in the Caribbean. As a human geographer, I was fascinated with understanding how stakeholders get engaged—or excluded—in the production of climate services. In 2017, I led a review of the WMO's Global Framework for Climate Services, where I was able to gain a more global understanding of international cooperation and conflict in the climate services space.

Meaghan Daly (Univ. of New England): *How to effectively evaluate the Regional Climate Outlook Forums (RCOFs) has been a longstanding challenge, and it is a question that has intrigued me personally since I attended my first Regional Climate Outlook Forum (RCOF) in Nairobi in 2010.*

Simon Mason (Columbia University): *In the mid-1990s, I was invited to participate in the first ever Regional Climate Outlook Forum, which was hosted by Zimbabwe in 1997. Much of my career since has been devoted to helping countries set up their own seasonal forecasting systems.*

BAMS: What surprises you the most about this article?

MD: *A surprising aspect of this research was just how little is still known about the societal benefits that RCOFs may—or may not—provide, despite the fact that they've been in operation for more than two decades.*

A young girl with dark skin and curly hair is standing on a dirt trail in a forest. She is wearing a purple and pink plaid shirt and a green backpack. She is looking up and to the left with a smile. In her right hand, she holds a silver flashlight. The background is a dense forest with tall trees and green foliage.

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