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A Call to Action: Seven recommendations to boost public engagement and decision-making on climate change

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Abstract. Despite the Paris Agreement's ambitious targets, global efforts to reduce greenhouse gas emissions and implement climate adaptation measures are insufficient. This paper argues that effective public engagement and informed decision-making are critical to closing the gap between current practices and necessary actions. We identify key communication challenges that impede climate action and propose seven recommendations to strengthen public understanding and empower decision-makers. Through a multi-level study that examines the perspectives of science communicators, policymakers, and IPCC contributors, we highlight strategies for effective communication, the need for optimism in messaging, and the importance of education and grassroots actions. We advocate for an adaptation-first approach to catalyze mitigation efforts and promote a coordinated communication strategy to counter misinformation and drive climate action.

1 Introduction

We are currently off track in reducing greenhouse gas emissions to meet the targets of the Paris Agreement, and the pace of implementing necessary adaptation measures is insufficient to respond to the climate change impacts that are already unfolding. These are two indisputable facts (Andersson et al., 2020; Ricciardi et al., 2021; Sun et al., 2022).

Despite the transformative potential of the Paris Agreement, it has not led to a substantial reduction in CO_2 emissions over the past decade, nor has it operationalized essential adaptation mechanisms (Roelfsema et al., 2020). While it may be premature to label the Paris Agreement a failure, it is clear that it has yet to fully achieve its objectives (Geden, 2016).

Currently, atmospheric CO_2 concentrations are increasing at approximately 2.4 ppm per year, setting a trajectory toward levels exceeding 600 ppm by the end of the century. This trajectory correlates with an estimated global temperature rise of around 3 °C above pre-industrial levels (Young, 2016).

From these data, two conclusions emerge: first, that limiting warming to 1.5 °C – the lower target of the Paris Agreement – has likely become unattainable, as current warming already approaches this threshold (Anderson et al., 2020); second, that urgent adaptation measures are essential to respond to the accelerating climate changes now underway. Achieving this requires not only maintaining current emission levels but also committing to the Paris Agreement's objective of significantly reducing greenhouse gas emissions (Papadimitriou et al., 2019).

A critical question arises from a scientific perspective: Why have we been unable to reduce emissions effectively or accelerate adaptation to climate change? And, importantly, what strategies can we implement to overcome these challenges?

In this letter, we offer recommendations based on broader research into communication approaches and strategies that could facilitate effective decision-making in the fight against climate change.

Our research focuses on understanding effective climate change communication at local and international levels through insights gathered from three distinct study groups. The first group, *science communicators*, consists of veteran television meteorologists who report daily on weather and climate to millions of viewers, shaping public understanding on a large scale (Molina and Abadal, 2022). The sec-

ond group, termed *science makers*, includes National Meteorological Services and scientists involved in drafting the Summary for Policymakers for the fifth and sixth assessment cycles of the Intergovernmental Panel on Climate Change (IPCC) (Molina and Abadal, 2024b, a). The third group, labeled *decision-makers*, comprises individuals across various administrative levels, including government and non-governmental agencies, as well as activist organizations that participated in or were connected to the 2023 Conference of the Parties (COP26) in Glasgow.

To capture their perspectives, we conducted a series of surveys and interviews with members of each group, aiming to identify effective communication strategies for climate action.

Additionally, we examined the calls to action in the IPCC's various Summary for Policymakers reports, particularly focusing on the level of certainty associated with the claims made in these reports (Molina and Abadal, 2021).

A substantial portion of our research has already been published or is forthcoming (Molina, 2025). This comprehensive international study, encompassing perspectives from weather presenters, National Meteorological Services, IPCC scientists, and policymakers across 100 countries, advocates for a broad approach to climate communication. This approach integrates traditional media and institutional strategies while also embracing political and social actions that reflect diverse social, cultural, and economic viewpoints.

In this letter to the editor, we present a set of recommendations designed to enhance public understanding of climate change and to support decision-making processes critical for adaptation and mitigation in the face of this global challenge.

2 Recommendations

2.1 Enhancing Public Engagement with IPCC Reports Through Key Summary Texts and Visual Aids

Future IPCC cycles could include, alongside each synthesis report, a document highlighting key scientific points crafted by scientific editors and communication experts. This initiative could standardize the dissemination of information, fostering a more informed and engaged global society regarding climate change issues.

2.2 Avoid negative or fear-inducing campaigns

Advocate for a communication approach that steers clear of fear-inducing messages, proposing instead that framing climate change communication in an optimistic and responsible tone could foster a more constructive public engagement and action.

2.3 The battle against conspiracy theories and conspiratorial thinking

A professional and effective communication strategy on climate change serves as an antidote to such misinformation, but combating the spread of conspiratorial thinking in society requires more directed action and further research.

2.4 Incorporating climate change education at all levels, including university education

The integration of subjects that enable an understanding of climate change into the existing curricula of elementary, primary, and secondary education. Furthermore, higher education is advised to incorporate transversal competencies in environmental knowledge and sustainability.

2.5 Grassroots sustainability action groups within professional and workplace communities

To foster the formation and action of grassroots groups within businesses and organizations to implement specific sustainability measures at their workplaces. While external regulations may encounter resistance, active participation by employees can create a sustainable movement that aligns with the company's mission and goals, offering a durable and integrated approach to combating climate change.

2.6 Informed Complex Governance by Climate Change Communication

The integration of complexity into policy creation and decision-making processes, advocating for direct and mutual communication among stakeholders with transparent information sharing, aiming to ensure inclusive interaction and contributions in climate negotiation spheres.

2.7 Adaptation as a Catalyst for Mitigation

Prioritizing adaptation as a primary strategy in the fight against climate change fosters a protective societal perception and awareness of risks, stimulating personal emission reductions and increasing policy demand for climate change mitigation measures. This bottom-up approach in societal and economic activities underscores adaptation as a crucial stimulus in combating the unwanted changes affecting our environment, advocating for adaptation-first strategies as an effective means to catalyze broader mitigation efforts.

Data availability. All data, methodology and discussion can be found at https://diposit.ub.edu/dspace/handle/2445/218052 (Molina, 2025).

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References

Anderson, K., Broderick, J. F., and Stoddard, I.: A factor of two: how the mitigation plans of 'climate progressive' nations fall far short of Paris-compliant pathways, Clim. Policy, 20, 1290–1304, https://doi.org/10.1080/14693062.2020.1728209, 2020.

Andersson, M., Baccianti, C., and Morgan, J.: Climate change and the macro economy (ECB Occasional Paper), ECB Occasional Paper, https://doi.org/10.2866/83282, 2020.

Geden, O.: The Paris Agreement and the inherent inconsistency of climate policymaking, WIREs Clim. Change, 7, 790–797, https://doi.org/10.1002/wcc.427, 2016.

Molina, T.: La comunicació del canvi climàtic: Accions i estratègies per augmentar-ne la consciència en l'opinió pública i millorar-ne la presa de decisions, Informació i Comunicació, Universitat de Barcelona [data set], https://hdl.handle.net/2445/218052 (last access: 8 July 2025), 2025.

Molina, T. and Abadal, E.: The evolution of communicating the uncertainty of climate change to policymakers: A study of IPCC synthesis reports, Sustainability, 13, 52466, https://doi.org/10.3390/su13052466, 2021.

Molina, T. and Abadal, E.: Communicating Climate Change. An international survey to weather broadcasters, SSRN Electron. J. [preprint], https://doi.org/10.2139/ssrn.4059084, 2022.

Molina, T. and Abadal, E.: Communicating the most accurate and reliable science on climate change to society: A survey of editors from the Intergovernmental Panel on Climate Change, Geosci. Commun. Discuss. [preprint], https://doi.org/10.5194/gc-2024-8, 2024a.

Molina, T. and Abadal, E.: Exploring the role of national weather services in climate change knowledge and communication: an international survey, Discov. Atmos., 2, 16, https://doi.org/10.1007/s44292-024-00019-1, 2024b.

Papadimitriou, L., Holman, I. P., Dunford, R., and Harrison, P. A.: Trade-offs are unavoidable in multi-objective adaptation even in a post-Paris Agreement world, Sci. Total Environ., 696, 134027, https://doi.org/10.1016/j.scitotenv.2019.134027, 2019.

Ricciardi, A., Iacarella, J. C., Aldridge, D. C., Blackburn, T. M., Carlton, J. T., Catford, J. A., Dick, J. T. A., Hulme, P. E., Jeschke, J. M., Liebhold, A. M., Lockwood, J. L., MacIsaac, H. J., Meyerson, L. A., Pyšek, P., Richardson, D. M., Ruiz, G. M., Simberloff, D., Vilà, M., and Wardle, D. A.: Four priority areas to advance invasion science in the face of rapid environmental change, Environ. Rev., 29, 119–141, https://doi.org/10.1139/er-2020-0088, 2021.

Roelfsema, M., van Soest, H. L., Harmsen, M., van Vuuren, D. P., Bertram, C., den Elzen, M., Höhne, N., Iacobuta, G., Krey, V., Kriegler, E., Luderer, G., Riahi, K., Ueckerdt, F., Després, J., Drouet, L., Emmerling, J., Frank, S., Fricko, O., Gidden, M., Humpenöder, F., Huppmann, D., Fujimori, S., Fragkiadakis, K., Gi, K., Keramidas, K., Köberle, A. C., Reis, L. A., Rochedo, P., Schaeffer, R., Oshiro, K., Vrontisi, Z., Chen, W., Iyer, G. C., Edmonds, J., Kannavou, M., Jiang, K., Mathur, R., Safonov, G., and Vishwanathan, S. S.: Taking stock of national climate policies to evaluate implementation of the Paris Agreement, Nat. Commun., 11, 2096, https://doi.org/10.1038/s41467-020-15414-6, 2020.

Sun, R.-S., Gao, X., Deng, L.-C., and Wang, C.: Is the Paris rulebook sufficient for effective implementation of Paris Agreement?, Adv. Clim. Change Res., 13, 600–611, https://doi.org/10.1016/j.accre.2022.05.003, 2022.

Young, O. R.: The Paris Agreement: Destined to succeed or doomed to fail?, Politics Gov., 4, 124–132, https://doi.org/10.17645/pag.v4i3.635, 2016.