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SUPPLEMENTARY INFORMATION

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Narrowing the climate information usability gap

Key References

Buizer, J., Jacobs, K. & Cash, D. Making short-term climate forecasts useful: Linking science and action. *Proceedings of the National Academy of Sciences* (2010).
By reviewing international examples of successful boundary organizations in the application of El Niño-Southern Oscillation (ENSO) forecasts, this paper identifies critical features that are key to the success of boundary-spanning activities.

Cash, D.W. et al. Knowledge systems for sustainable development. *Proceedings of the National Academy of Sciences of the United States of America* **100**, 8086-8091 (2003).
The authors argue that creating institutions that harness science and technology for sustainability are more likely to be effective when the boundaries between knowledge and action are managed and when communication, translation, and mediation across boundaries is supported.

Kline, S.J., N. Rosenberg (ed.) An overview of innovation. (National Academy Press, Washington, D.C; 1986).
The chain-linked model of innovation was designed to run the 'engine of innovation' - the firm, by viewing innovation as a process involving multiple feedbacks between potential market, sequentially through invention and design; design testing, retesting and finally distribution into markets, and the appeals to the contextual characters that make the innovation successful.

Lemos, M.C. & Morehouse, B. The Co-Production of Science and Policy in Integrated Climate Assessments. *Global Environmental Change* **15**, 57-68 (2005).
This paper examines integrated assessments arguing that highly interactive models of research achieve higher levels of innovation and societal impact.

Rayner, S., Lach, D. & Ingram, H. Weather forecasts are for wimps: why water resource managers do not use climate forecasts. *Climatic Change* **69**, 197-227 (2005).
Using three case studies, this paper identifies institutional barriers to water managers' use of forecasts and argue that increasing forecast use requires synergizing existing operational norms, routines and incentives to support forecast use.

Sarewitz, D. & PielkeJr., R.A. The neglected heart of science policy: reconciling supply of and demand for science. *Environmental Science & Policy***1 0**, 5 – 1 6 (2007).
Using climate change science as an example, this paper argues that prodcution of science with desired societal outcomes can be achieved when science based policy decisions reflect not only the supply of science but also its societal demand and the relationship between the two.

Stokes, D.E. Pasteur's quadrant: Basic science and technological innovation. (Brookings Institution, Washington, DC; 1997).
In recognizing the importance of use-inspired basic research, Stokes argued convincingly for a new, interactive view of science and technology that reshaped the compact between science and government and influenced both the scientific and policy communities.