RESOURCES *for the* FUTURE

# Measuring How Scientific Research Benefits Society Using Economics

*What do economists mean by value, and how do they think about the value of information?*

Explainer by **Yusuke Kuwayama**, **Justine Huetteman**, and **Bethany Mabee** — March 5, 2019

Scientists and scientific organizations are increasingly interested in understanding and communicating how their work benefits society. It is now common to hear catch phrases like "actionable science," "science to action," and "science to policy" around university centers, scientific conferences, and research publications.

Professional organization such as the American Geophysical Union (AGU), Institute of Electrical and Electronics Engineers (IEEE), and American Association for the Advancement of Science (AAAS) all have significant initiatives to help scientists better understand the role of scientific information in addressing stakeholder needs and pressing policy issues.

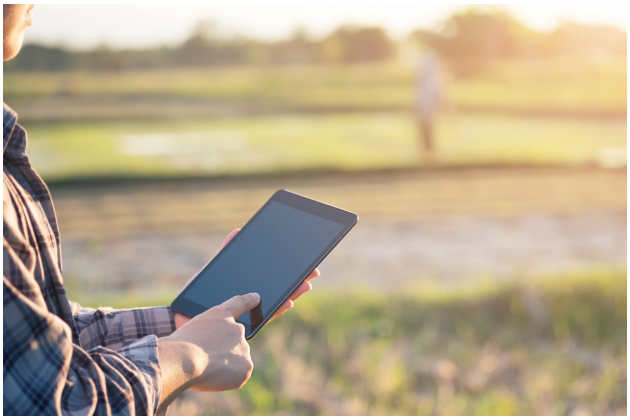
This interest in the societal value of science is consistent with what we hear from a lot of scientists—that they chose their career path because they want to make the world a better place.

The most straightforward way that science makes the world a better place is by creating new information that leads to improved decisions by individuals and organizations, which in turn can lead to improved outcomes for people and the environment.

For example, scientific research that improves weather forecasts can help communities better prepare for hazards such as hurricanes and flooding, reducing property damage and loss of life. It can help farmers to optimize their irrigation schedules, increasing crop yield and reducing water use.

Measuring the magnitude of these improvements to societal outcomes—lives saved, increases in crop yields, and reductions in water use, for example—is one way that scientists can understand and communicate the benefits of their work.

It is important to note that the socioeconomic benefits described above are not the only benefits of scientific research and application. Indeed, humankind has greatly benefited from the pursuit of knowledge for its own sake, without a view to obtaining directly actionable information.



*Measuring the value of information is one way for scientists to understand and communicate how their research makes the world a better place. Socioeconomic benefits are an important (but not the only) class of benefits that arise from scientific research. Photo: PrathanChorruangsak/iStock/Getty Images Plus*

There are also many benefits of using Earth science information that simply cannot be quantified. Most of these cases involve the use of information in decisions that are difficult to document, such as the use of satellite data by the military (which may be unable to tell us how they use these data due to national security concerns) or uses of scientific information by private companies (in which the nature of how the information relates to company profits is a trade secret).

Finally, some scientists may be hesitant to think about the value of their research in terms of outcomes such as the number of lives saved or acres of forest conserved. Others may not be comfortable with describing the value of improvements in these outcomes in monetary terms.

However, thinking about value in economic terms can be useful. Quantifying the value of Earth science information when people use it to make decisions offers scientists a compelling empirical tool to capture the value that their work generates for people and the environment.

## The VALUABLES Consortium

The ideas presented here inform the tools developed by the **VALUABLES Consortium**, a cooperative agreement between Resources for the Future and NASA that is quantifying the value of Earth observations in decisionmaking and developing resources Earth scientists can use to measure the societal benefits of their work when people use it to make decisions.

Learn more by exploring the consortium's **tools and resources for Earth scientists** and **relevant studies**. To be notified about future posts in this series, **sign up to receive emails** from the VALUABLES Consortium and follow us on Twitter at **@RFFvaluables**.

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**Resources for the Future** (RFF) is an independent, nonprofit research institution in Washington, DC. Its mission is to improve environmental, energy, and natural resource decisions through impartial economic research and policy engagement.


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