



Communicating Research Results to Stakeholders: What Scientists Can Learn from Cooperative Extension

Jean E. McLain and Channah M. Rock

A key task faced by all members of the water research community is to communicate the results of their research to stakeholder groups. Effective communication involves a range of tactics depending on the audience's cultural background, level of understanding, and interest (financial, political, or other) in the research topic. Opportunities to communicate scientific results are also varied, ranging from peer-reviewed publications and presentations at scientific conferences, to conversations with community groups, to meetings with elected officials. Successful scientific communication involves gauging exactly what the audience needs to know and how to effectively deliver this information, either verbally or in writing. And yet, though early career water research professionals may leave their undergraduate or graduate studies well-versed in planning and conducting scientific study, upon graduation, their skill in communicating scientific results to stakeholders is often limited to peer-reviewed publications.

Land grant universities, including the University of Arizona, have been tasked with providing and applying science-based information to a wide range of audiences beyond their campus and laboratory walls. Fulfilling that responsibility requires the activities of Cooperative Extension, a program implemented in the United States to help people use research-based knowledge to improve their lives. By framing scientific information in a manner that is highly relevant to stakeholders, Extension educators play important roles as communicators of science. What can water scientists learn from Extension that will facilitate effective transmission of scientific knowledge to a wide array of stakeholders?

First and foremost, Extension professionals do not 'dumb down' scientific results; this is an objectionable term, for Extension and for the target audience. Rather, Extension educators focus on communicating research results objectively, in a way that is accessible, succinct, and in plain language. Very often, they must craft multiple messages for a variety

of constituents, and must also be prepared to respond to the myriad ways in which research results may be interpreted, and yes, sometimes misinterpreted. The authors of this article, both Extension professionals, are involved in research projects focused on recycled water quality and public health safety – a subject of intense current interest to a wide diversity of stakeholders. In one particularly active week in 2017, we traveled to Washington, DC, to provide testimony before a United States Congressional Committee, participated in roundtable discussions with regulatory agencies in California and Arizona, and presented results to multiple citizen science groups in rural Arizona. How do Extension professionals cover so many bases? By creating research programs that are stakeholder-driven, successful Extension professionals ensure that research findings reflect the needs of the stakeholders, and that, in turn, the results have a much higher likelihood of being acknowledged and used.

And so what can researchers learn from Cooperative Extension? Researchers can start projects with the end users in mind, asking the questions, 'Who is invested in the findings?' and 'What do they want to know?'. By keeping these questions in mind, researchers are better equipped to frame the research questions appropriately and communicate the findings to stakeholders in a way that is meaningful to them. Doing so requires building relationships with stakeholder partners and working to involve them in research, to ensure that the research is relevant to their decision-making needs. Because water science is by nature multifaceted, involving water quality and quantity, water management, engineering, policy, and public health, water researchers should consider the needs of a broad array of stakeholders from the start of a research project to increase the likelihood of achieving transdisciplinary goals. Research planning and implementation should include the active involvement of practitioners, planners, and program managers, or other end-users of the developed information. This approach can be intimidating to researchers, as they

find that they no longer possess exclusive control of research evidence. But rather than diluting the research findings, this type of interaction results in data that are context-sensitive, thus responding to user needs and demands. A strong example of this comes from an Arizona municipality that was facing intense questioning regarding the quality of their recycled water; members of the public had concerns about contaminants in the water and their potential to harm humans coming into contact with this water source. Design of a 3-year research study included input from the municipal water professionals, public health workers, and members of the public, to ensure that all concerns were addressed.

As projects proceed and opportunities arise for communicating results to stakeholders, researchers should consider the right venues, formats, and strategies for communicating with that audience. Although peer-reviewed papers are certainly one option, it is important to keep in mind that the release of a peer-reviewed research report is only one aspect of an overall communication plan, and primarily reaches one kind of audience. Research results can also be effectively disseminated through conference presentations, press releases, radio spots, one-on-one meetings with community leaders and elected officials, and interactions with neighborhood groups. Dissemination of results from the above-referenced recycled water research project included technical reports, as well as meetings with the local press and the general public, to assure that all stakeholders had a full understanding of the findings. Every project has multiple potential audiences, each with unique concerns. Messages must be appropriately tailored. For example, a beautifully-produced DVD with photographs that capture the research project impact is useless if members of the intended audience do not have DVD players. Research results targeting Native American communities in rural Arizona via YouTube videos assumes access to the internet with sufficient bandwidth, when in reality, many homes in these areas lack a reliable electrical supply. A more effective means of communication may be tribal news outlets and/or community group meetings where videos could be viewed.

Although communicating with the general public is often daunting for scientists, it can be extremely rewarding when the Extension model is followed: *Speak simply and clearly. Avoid overly technical jargon. Use vivid and specific details, and describe the biggest, most compelling findings.* Successful Extension professionals communicate science to the public in terms that resonate with core values and beliefs held by that community – framing irrigation water quality research results to fresh produce growers in a way that describes the protection of public health would be very effective, for example. This is not ‘dumbing down,’ rather it is ‘reframing’ the scientific

knowledge to make the information important and useful to individuals and to motivate them to acquire additional knowledge or to take specific actions. When sufficiently motivated, stakeholders and the public demonstrate impressive abilities to process scientific issues.

All of this makes science planning and communication as part of a team sound simple, but what barriers do we face? Some stakeholders may not be aware of the timeline needed to acquire scientific evidence, and many of them operate in environments with unique pressures. Their timelines for action can be very short, and their expertise in applying or balancing different inputs to solve problems may be limited. Communication of timelines from the beginning of a project is very important, but so is flexibility. Windows of strategic opportunity might suddenly open to which your team must respond quickly. Recently, our research team was asked to draft an article for a high-profile news outlet on short (one week’s) notice, requiring a concerted and focused team effort that resulted in a widely read publication.

Communicating science is a multifaceted and complex process. Like Extension professionals, scientific researchers don’t just provide ‘facts’ that then drive change. Rather, they rely on back-and-forth interactions to develop relevant results, interpret them, and translate them into action. The dissemination-of-results process must be part of the project cycle and involving stakeholders in the process early will enhance the ultimate uptake of the research findings.



THE UNIVERSITY OF ARIZONA
Cooperative Extension

THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE AND LIFE SCIENCES
TUCSON, ARIZONA 85721

JEAN E. McLAIN

Research Scientist, University of Arizona Department of Soil, Water and Environmental Science

CHANNAH M. ROCK

Associate Professor and Water Quality Extension Specialist, University of Arizona Department of Soil, Water and Environmental Science

CONTACT:

JEAN E. McLAIN

mclainj@email.arizona.edu

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