

# Overcoming the Challenges of Co-creation

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Co-creation, when scientists and community leaders work together to guide, apply, and even do research, can make a positive community impact and can enhance public support and understanding of science. Unfortunately, differences between scientists and community leaders make co-creation challenging. Science organizations, like AGU, can support co-creation by developing processes, offering training, providing recognition, sharing results and building partnerships that help scientists and community leaders connect and build trust. Scientists can apply design strategies that overcome challenges, even in the absence of institutional support.

## What Can Scientists Do?

### 1. Design for Action

Scientists working with this Denver Neighborhood tested new low-cost instruments that residents could use to check their homes for harmful chemicals spilled by nearby drycleaners. Residents insisted that the experimental protocol include remediation options, which they did by linking to existing programs for managing Radon exposure.



### 2. Base Action on Evidence

Managers near this waterway asked for science that could show that disposing of lime used in water treatment would be harmful. Thriving Earth Exchange suggested scientists could do the analysis independently and share the analysis publicly in a way that was designed to help water managers make an informed decision.



### 3. Manage Data Together

For White Earth Nation, wild rice is a source of cultural identity, a route to better nutrition and a potential economic engine. Collecting data to help guide harvest of rice and protect water quality had to be done in a way that honored tribal sovereignty, respected spiritual places, encouraged community participation, and informed regulation.



### 4. Value Local Knowledge

Residents of the Sahel have long noted that meningitis is a dry season disease with cases ending after the onset of the rainy season. Researchers tracked this link to changes in humidity. New tools use relative humidity forecasts to help researchers better allocate limited vaccines, preventing as many as 24000 cases in three years.



### 5. Engage Broadly

In community meetings about managing future flood events in a changing climate, women were less vocal. A women's-only community meeting (shown here) shifted the focus from physical impacts to impacts on disease transmission. The community chose to prepare for climate change by building sewers, so flood waters (which they could manage physically) no longer spread disease.



### 6. Budget Together

Residents and researchers in the Denver Project above used crowdfunding to raise \$4,500 for their project. Not only did they jointly manage the money and share the overhead, but their project is accountable not to an external funding agency but to the community residents who contributed financially.

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## 7. Think Broadly

Researchers worry that focused expertise is not useful to community leaders. One young geoscientist said, “What community needs someone who can do X-Ray Crystallography?” Thriving Earth Exchange can help you use your broad knowledge of geoscience, network of experts, and your capability to understand and translate research.



## 8. Build Deliverables

We encourage Thriving Earth Exchange projects to build deliverables that go beyond publication and are broadly useful, like the interactive app that emergency managers can use to look at flood risk and add their own observations to the real-time predictions of flood risk. (Photo courtesy of the TEX-AWS FLASH project)



## 9. Start Small

At Weber State University departments borrowed from a small loan fund to invest in energy savings and contributed 75% of savings to the loan fund. This prioritized lower cost actions with short-term pay off and built capital for more major investments with slower return.



## 10. Use Agile Development

Agile design builds iteratively with rapid prototyping and heavy user input and ensures that, even if a project ends early, there are still usable products. Researchers and Western Kentucky used this strategy to work with water managers to build a tool that integrated local data in water management and improved decisions.



## What Causes Challenges?

|                        | Science   | Community Leaders  |
|------------------------|---|--|
| <b>Timescales</b>      | Often flexible  | Deadlines drive action with or without available information                   |
| <b>Deliverables</b>    | Process & communication oriented, null results are still useful | Decision-oriented, null results are often seen as time lost                    |
| <b>Typical Output</b>  | Papers – methods and results primarily for peers                | Tools to help non-peers make decisions: cost-benefit analyses, scenarios, etc. |
| <b>Orientation</b>     | Toward highest possible precision and accuracy                  | Learn enough to make a decision and move on                                    |
| <b>Budgets</b>         | Tight and scrutinized   | Tighter and, if possible, even more scrutinized                                |
| <b>Science</b>         | Primary factor  | One of many factors  |
| <b>Collaboration</b>   | Shared values   | Negotiating compromises across different values                                |
| <b>Decision-making</b> | Evidence-based (credibility-based)                              | Consensus-based (legitimacy based)   |
| <b>Publicity</b>       | Projects leads decide when to publicize                         | Part of a larger public process  |

## What Can Science Institutions Do?

**Develop Processes:** Frameworks, templates, and guides can help people launch, carry out and evaluate community science.

**Offer Training:** Experiential learning with mentoring can help people apply and customize templates and hone relational and analytic skills to solve multidisciplinary and multisector problems.

**Build Partnerships:** Links between organizations make it easy to seed projects, provide connections between scientists and community leaders, offer a structure, and organizations’ intros can speed on-the-ground trust building.

**Publicize Results:** Actively disseminating results from projects can encourage scientists and give new projects a starting point. Publicizing with partners can engage community leaders.

**Offer Incentives:** Both research and community-based organizations need to offer special recognition to boundary spanners – since their work often fall outside of traditional roles and incentives.