



# Community Science Guidance for Scientists

Community science is defined as the process by which scientists and communities do science together to advance one or more community priorities. It's a way of doing science that prioritizes community impact over publishable results. Successful community science requires skills and approaches that are not always emphasized or rewarded in traditional science research or education.

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## Overcoming the Challenges of Community Science

Community Science, 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 the co-creation of science 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.

Thriving Earth Exchange (TEX), powered by AGU, connects Earth and space scientists with community leaders and helps them work together on projects that use Earth and space science to advance community priorities. TEX has launched over 60 collaborative projects, giving us a view into the challenges of community science and some of the successful strategies that have been used to overcome those challenges. The contents of this page were presented at the 2016 AGU Fall Meeting and summarize what we have learned from our projects. For more information, please contact [tex@agu.org](mailto:tex@agu.org).

### What Causes Challenges?

*This table contrasts the practices and characteristics of science and community decision making or planning. These contrasts often need to be reconciled for community science to be successful.*

	Science	Community Decision-making
<b>Timescales</b>	Often flexible, next steps can wait until information is available	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 decide 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>	Project leads decide when to publicize	Part of a larger public process

*...So, what can scientists do? See pages 5-7 to find out! But first:*

## Getting to Know a Community

*It is important to ask a range of questions so that you can understand community context, culture, and priorities.*

*Some suggested questions to ask include:*

**Community Capability** - e.g. start from strength and respect.

- What makes your community special – if you could tell me one thing about it, what would it be? What are your greatest strengths? What are you most proud of? What have you done already and what changes have you made?

**Versions of “What are your Issues that Touch on Geoscience”**

- What does your community worry about in terms of weather, climate? Sustainability? Natural disasters? Pollution? Health? Environmental Justice? Earth science?
- What issues get relegated to the back burner that you wish you had more time to address now?

**Solutions/Vision**

- What would you like to see different in 10 or 15 years?
- What would you like to accomplish this year that sets you up to accomplish even more next year?
- What does a 10-year-old in your community look forward to when they are 20?

**Inclusion**

- Who in the community is typically left out of these conversations?

**Challenges**

- What are the obstacles to addressing the issue(s) noted above?

**Communication**

- How do you typically interact with your peers? What is the best way to introduce these issues? *Don't be afraid to think of town halls, one-on-one's, informal events.*

## Developing Collaborative Projects

Once you've familiarized yourself with the community, it is time to formulate project ideas. This is often an iterative process. Hopefully, both you and your community partner will have initial ideas, even if they are incomplete. Your initial project ideas will help to generate conversation with the community; providing fodder for discussion and feedback. Together, you will learn more about each other and refine the project ideas as a team. Don't be too alarmed if your initial project ideas aren't met with wild approval or perfectly match your area of expertise. At this point, it is best to think about how you can best tap into your interdisciplinary knowledge.

### Questions to Spark Thinking:

- **What are the community priorities?** Ensure that your ideas build off community priorities and support community objectives. This is the single best "foundation" for a project – based on specific community concerns, interests, and questions.
- **What ideas do community leaders already have?** This is a great way to kick-off brainstorming. Make sure you focus first on the best parts of their ideas, and avoid negative or critical comments that could inhibit open conversation. If they do have ideas, make sure you tease them out with good questions: 1.) What problem are they trying to solve with their idea? 2.) what key questions would they like to answer? Their initial ideas may not make great projects, but the concern or issue behind the idea might be the start of a different kind of technical project.
- **How does this project idea relate to a pending decision?** Consider any time-sensitive timelines that need to be met by the community.
- **What categories do your ideas fall into?** If folks are stuck, it helps to think in categories – what could you do that is related to pollution, environmental justice, agriculture, natural hazards, energy use? Combining categories can also help you think in an interdisciplinary manner.

### Recommendations for Framing the Project:

- **Consider: If I were the pro bono scientist on this project, would this be doable?** Aim for something that could be accomplished with the inputs of one volunteer scientist committing 2-5 hours per week, on average, over a year.
- **Every idea is valid: Ask what could make it work, not why it won't.** A bad idea might launch a productive conversation. It is ok to say, "here are some ideas, let's make them better together!"
- **Reframe your perspective.** Is the question "how can I afford a truck that sweeps streets", or is it "how can I keep the streets clean"?
- **Assess internal and external barriers.** Think about politics or other barriers that might prevent the project from being completed and manage those from the outset.
- **Consider: What are the community strengths?** Outline the community's strengths and leverage them.

### Caveats and Cautions

- **Reserve most of any community data collection for a later project.** Focus the initial project on making use of existing data.
- **Don't default to published research.** In community science, results are often shared and accessed more easily and usefully in other ways. How you share and translate your work may include peer review publication, but should extend to more accessible formats, such as infographics, community town forums, etc.

## Values for Meaningful Engagement:

### Collaboration is an Iterative Process

#### Ask and Listen

Acknowledge that there are types of knowledge beyond scientific and technical data; listen to community members about their needs; and respect their history, culture, and priorities. Communities are aware of the impacts they face. They possess unique knowledge about potential solutions through their experience, history, culture, and interactions with their neighbors and environment.

#### Mutually Define Goals

Scientists and community members may operate with differing cultural norms, expectations, and ways of expressing themselves. Make sure you're on the same page and in agreement when you chart out a collaboration's purpose, desired outcomes, and expected involvement (e.g., timeframes, deadlines, capacity).

#### Apply Your Science to Help Build Capacity

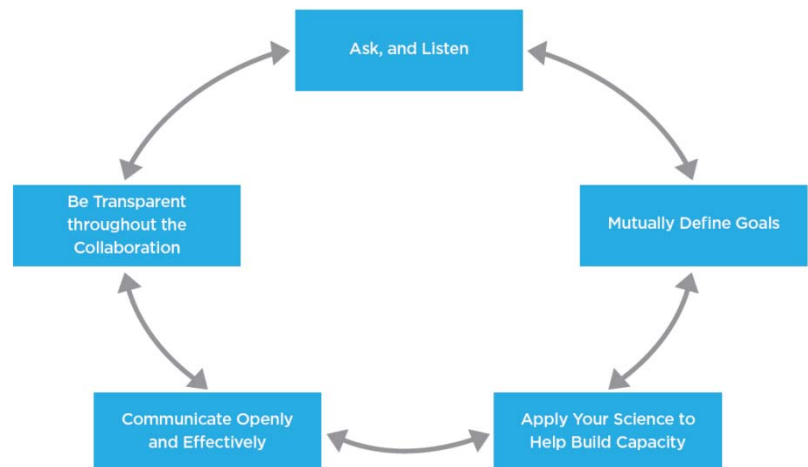
Scientific expertise can help provide communities with information that makes them stronger advocates. Your interactions with community groups can add value to their cause, be it through technical knowledge, skills, connections to other researchers, or credibility with decision makers or the media.

#### Communicate Openly and Effectively

Science is often steeped in technical terms, but communicating without jargon is critical not only to building understanding of your work, but also to bridging the divide that may exist between scientists and the public. Consider the audiences with whom you will be communicating (e.g., local residents, decision makers, the media), their needs, and their understanding of the topic to shape how you share your research and scientific knowledge. Don't be afraid to ask community members for their advice about how to communicate more effectively.

#### Be Transparent Throughout the Collaboration

Transparency and accountability from the start are essential to building trust. The information you gather and share with communities needs to be based in the questions they are asking. If you involve the community in a research project, be sure to share your data and findings with community members first, before disseminating it to broader audiences. Stay in close contact with the communities you work with and raise issues as soon as you notice them.



Source: *Scientist-Community Partnerships: A Scientist's Guide to Successful Collaboration*. Union of Concerned Scientists. 2016.

## Tips & Strategies for Successful Community Science Projects

- 1. Conduct a Needs Assessment:** Gather community leaders and stakeholders together through an interview or focus group to *fully listen* to their needs and questions.
- 2. Build Sound Relationships:** Build projects from a place of authenticity and respect, in a mature manner.
- 3. Ensure Safety:** Arrange interactions in a way that ensures physical safety, interactional safety, and epistemic safety of all participants. Interactional safety ensures that you do not alienate or anger people by placing them too far outside their comfort zone. Epistemic safety creates a space where participants are encouraged to raise doubts and ask questions. Remember, an unsafe learning environment can interfere with learning and potentially alienate team members.
- 4. Value Local Knowledge:** Acknowledge that there are types of knowledge beyond the scientific and technical variety. Respect community history, culture, beliefs and priorities.
- 5. Design Projects Together:** Plan and organize projects together to help build trust within teams and ensure that community priorities are properly addressed.
- 6. Be Accountable to Yourself & Your Team:** Set clear, measurable goals for each team member from the start of the project and outline team roles and assign tasks. Schedule frequent check-ins with your teammates to discuss progress made along the course of the project. Be honest about your capabilities and don't be afraid to ask for help.
- 7. Engage in Action with Reflection:** Pause to self-reflect along the way...is the project meeting everyone's expectations? If not, have you built in enough flexibility to change course?
- 8. Base Action on Evidence:** Ensure that the team is ready to base action on the scientific evidence and not a political agenda.
- 9. Manage Data Together:** Collect and manage data together with the community in a way that respects and honors community interests, tribal sovereignty, or spiritual places.
- 10. Engage Broadly:** Ensure that all community members have a voice by engaging community members from across the community.
- 11. Budget Together:** Seek funding together and allocate any awards 50/50 between yourself and the community. By jointly managing the money and sharing the overhead, you build trust in the outcome and process of community science.
- 12. Think Broadly:** Draw on your broad knowledge and professional networks to find ways to engage with communities.
- 13. Build Deliverables:** Develop products that go beyond publications and are broadly useful such as interactive maps, infographics, or a community awareness-raising initiative.
- 14. Start Small:** Start small, start local. You can't change the world today, but you can take action locally today.
- 15. Use Agile Development:** Build deliverables iteratively with rapid prototyping and heavy user input that can be used even if the project ends early.
- 16. Do No Harm:** Community science projects do not inhibit opportunities, damage natural systems, or harm ecosystems or people.

## Additional Strategies for Engaging with Communities

### Listening

- Asking questions about what the community knows and does already (e.g. asset-based models of resilience and science literacy)
- Restating things you've heard to make sure you represented them well

### Honoring and Connecting to All Kinds of Expertise

- Offering science as one tool or source of insight, among many
- Connecting your deep subject knowledge to broad perspectives

### Staying Positive and Focusing on Solutions

- Suggesting solutions or positive approaches, rather than just outlining challenges, risks, and vulnerabilities
- Providing concrete examples, including approaches that have worked elsewhere
- Focusing on concrete, immediate actions - outlining first steps

### Using Good Science Communication Practices

- Highlighting what science can say about something, rather than focusing on the things science can't say or debating details
- Summarizing, in plain English, relevant scientific results and explaining why they matter
- Pointing to a specific tool or data set that you think matches community needs or priorities
- Translating climate science data and information into impacts that relate to a community's needs and priorities

### Less Effective Strategies

- Lecturing about what you think the community needs to know
- Being alarmist or pessimistic; only emphasizing challenges, risks, or vulnerabilities
- Trying to get the community to endorse an idea or approach you dreamed up first or elsewhere
- Putting science ahead of, rather than alongside, other community values or priorities
- Sending a copy of a highly technical paper for the community to read
- Suggesting community members look through an archive or tool repository without providing the proper support
- Arguing with other subject matter experts about details
- Ignoring or devaluing the knowledge and experience of community members
- Developing elaborate, long-term plans without identifying a place to start

### Mantras

- Knowledge speaks, wisdom listens (attributed to Jimi Hendrix)
- Relationships, not transactions
- Share values and aspirations, not just information
- Science is necessary but not sufficient
- Consistent communication and a collaborative process builds trust

## Ways to Engage with TEX

### **Volunteer as a Scientific Partner on a New TEX Project**

TEX regularly posts volunteer positions on its website. Specific skills and expertise are outlined on each project page. Apply for a project via the online form and a TEX project manager will help you see if your interests and expertise match the needs of the community.

### **Attend a Project Launch Workshop**

TEX regularly hosts Project Launch Workshops across the country. In TEX Project Launch Workshops, a facilitator helps communities and scientists work together to connect community priorities and Earth and space science. As a workshop participant, you will learn community science skills while working with community leaders to launch new projects.

### **Learn How to Use and Apply Community Science in Your Work**

Whether you are new to community science or looking to improve certain aspects of your engagement with communities, the TEX process and milestones are all documented and open-source.

### **Join Community Science Connect**

Community Science Connect is an online forum for communities, scientists and allies to share and discuss ideas and initiatives related to community science. Start a discussion, post a response or make new connections to build your network.

### **Share Community Science Stories and Lessons Learned at Fall Meeting**

Each year at AGU's Fall Meeting, a series of sessions highlights the impact of collaborations between scientists and communities, provides an opportunity to share successes and lessons learned, and serves to inspire the continued growth of community science engagement in the Earth and space science community.

### **Publish in AGU Publications like Earth's Future**

Earth's Future is a transdisciplinary, open-access science journal that examines the state of the planet and its inhabitants, and the predictions of its future. It is a good place to share the broader outcomes and implications of your community science project.

Visit [thrivingearthexchange.org/scientists](http://thrivingearthexchange.org/scientists) for more.

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