

# Chapter 6:
# Capacity Building

## Chapter Contents

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## Introduction

Capacity building[38] can be integral to the promotion and sustainability of environmental health programs. It is the "process that improves the ability of a person, group, organization, or system to meet its objectives or to perform better."[39] NIEHS has defined capacity building as "any activity that improves an entity's ability to achieve its mission"[40] and the "engagement of existing and new stakeholders [as well as] training for a variety of audiences."[41] By building capacity, PEPH projects can prolong and multiply positive health effects and partner benefits, thus adding value to outcomes. Sustained capacity can make individuals and organizations more competent, not only by addressing issues of direct interest to a project, but also by providing access to more resources, knowledge, and skills for addressing additional matters.[42]

Capacity building generally includes increasing organizational capacity, physical and communication infrastructure, and individuals' knowledge and skills. Increased capacity can lead to initiation and maintenance of a reduction in, or elimination of, environmental health exposures and risks. In this Manual, we organize our discussion of capacity building into three categories:

- **Organizational capacity:** Some organizations start from scratch and need to begin with building basic organizational structures. Others have existing frameworks that some partners have to learn to navigate. Writing down policies and procedures can help establish and transfer institutional knowledge and can contribute to organizational stability. Obtaining and building organizational capacity can increase partners' abilities to accomplish their goals. For example, developing operating norms and procedures that promote mutual respect, appreciation for differences, and opportunities for universal participation can facilitate effective partnerships.[43] In addition, nurturing human resources can lead to greater retention of staff and an increase in interest, motivation, and creativity among partners.
- **Physical and communication infrastructure:** Physical infrastructure is the basic equipment and building space needed for the operation of a PEPH project. Communication infrastructure is the underlying base for an organization's data, voice, and video systems.
- **Knowledge and skills:** A range of strategies and practices are used in an organization to identify, create, represent, distribute, and enable adoption of insights and experiences that can occur to individuals. Knowledge is often reflected in the understanding of organizational processes or practices, as well as in subject matter expertise. Skills are defined as the proficiency, facility, or dexterity that is acquired or developed through training or experience by individuals.



[38] For more information on capacity building, see Alliance for Nonprofit Management. 2010. About Capacity Building.

[39] Brown L, LaFond A, Macintyre K. 2001. Measuring Capacity Building: MEASURE Evaluation Project for USAID. Available: http://www.heart-intl.net/HEART/Financial/comp/MeasuringCapacityBuilg.pdf [accessed 19 January 2021].

[40] *Environmental Health Perspectives*, International Program. 2010. Capacity Building.

[41] NIEHS. 2008. Partnerships for Environmental Public Health: RFI Executive Summary. 12.

[42] Hawe P, Noort M, King L, Jordens C. 1997. *Multiplying health gains: The critical role of capacity-building within health promotion programs.* Health Policy 39(1): 29-42.

[43] Israel BA, Schulz AJ, Parker EA, Becker AB. 1998. Review of community-based research: *Assessing partnership approaches to improve public health*. Annu Rev Publ Health 19: 185.

## Using This Chapter

This chapter develops approaches and metrics for evaluating capacity among PEPH grantees, which includes various types of organizational and individual partners. Many of the approaches partners might take to assess resources, knowledge, and skills of partner groups and individuals might be the same (such as asking questions and discussing approaches). However, the actual capacity that these groups and individuals develop over the course of the project might differ. The next section in this chapter discusses how grantees can conduct capacity building at various levels:

- For the project as a whole.
- For a particular group within a project (community organizations, researchers, health professionals, policymakers, and decision-makers).
- For individuals within one of these groups.

The remainder of this chapter provides approaches and metrics for assessing capacity building activities, outputs and impacts in PEPH programs. Although approaches might be similar, the actual capacities addressed might vary across the various types of partners and might evolve over the course of a project. These approaches and metrics are generally drawn from PEPH examples and are intended to stimulate readers' thoughts and ideas. They are not intended to be a prescriptive set of steps to be followed.

## Levels of Capacity Building

PEPH programs typically focus on capacity building of community residents, researchers, health professionals and decision-makers so that these individuals and groups can work together on environmental public health projects. These individuals and groups have been identified as participants in various PEPH projects, and each has different needs, skills, and resources. This section identifies specific capacities that PEPH partners can emphasize for the four different target groups.

## Community Organizations

Local communities are one of the most common targets of PEPH capacity building efforts. Capacities sought by community organizations can include:

- Environmental health tools and skills.
  - Knowledge of community health indicators and environmental exposures.
  - Ability to assess community health.
  - Ability to communicate health impacts, risks, and data to citizens.
  - Ability to perform intervention and prevention strategies.
- Research process tools and skills.
  - Knowledge of the research process.
  - Grantsmanship (the ability to write grants, track, and manage funds, etc.).[44]
  - Ability to contribute to research question development.
  - Ability to participate in data collection, analysis, and outreach.
  - Systematic program evaluation.

[44] For more information on writing grant proposals for capacity building, see Chandler S. 2008. Writing Proposals for Capacity Building. The Grantsmanship Center.

## Researchers

Historically, academic institutions rarely had structures to foster or reward researchers for partnering with communities, decision-makers, or health care professionals. Because this is an evolving area for academic researchers, they may benefit from building a capacity to conduct collaborative research.

Capacity building for researchers might focus on training to work effectively with communities, regulators, legislators, public health officials, decision-makers and other partners.[45] Researchers could need formal training or cultural immersion along with other forms of capacity building to work in integrated, interdisciplinary teams involving community members, social scientists, economists, urban planners, community organizations, health professionals, decision-makers and others. Capacity building for researchers could involve the following skills and knowledge areas:

- Ability to provide training, mentoring, and infrastructure for the individuals in their organization.
- Ability to conduct collaborative, equitable research projects that engage other partners in research, using, for example, the principles of community-based participatory research.[46]
- Ability to facilitate the dissemination of findings and knowledge gained.
- Knowledge of scientific translation practices.
- Ability to translate scientific information into regulations and policies for the benefit of community members.
- Knowledge of cultural sensitivity and norms.
- Ability to interact in a culturally appropriate way with other partners.

## Health Professionals

Health professionals, such as doctors, nurses, clinicians, state and local health officials, as well as other public health professionals, are significant partners in PEPH projects. Because they are on the front line within the community, it can be important for health professionals to have state of the art understanding of environmental health-related issues. Yet clinical and public health professionals often lack formal environmental health and exposure training.[47]

Because they often have the greatest interaction with the public, nurses in particular can play a crucial role in environmental health. Nurses serve in a variety of specialty settings ranging from public health to acute care and are often the first point of contact for the public when environmental health concerns arise. Community members see nurses as trusted sources of information, and yet, like doctors, nurses often have not received any environmental health instruction.[48]



[45] For more information on capacity building in research projects, see Breen CM, Jaganyi JJ, van Wilgen BW, van Wyk E. 2004. Research projects and capacity building. Water SA 30(4): 429-434.

[46] Israel BA, Schultz AJ, Parker EA, Becker AB. 1998. Review of community-based research: assessing partnership approaches to improve public health. Annu Rev of Publ Health 19: 173-202.

[47] Mccurdy LE, Roberts J, Rogers B, Love R, Etzel R, Paulson J, Witherspoon N, Dearry A. 2004. Incorporating environmental health into pediatric medical and nursing education. *Environ Health Perspect* 112(17).

[48] Pope AM, Snyder MA. 1995. Nursing, Health & the Environment: Strengthening the Relationship to Improve the Public's Health. Institute of Medicine (U.S.), Committee on Enhancing Environmental Health Content in Nursing Practice.

Additionally, local and state health officials often play a critical role in public health monitoring and intervention in environmental exposure situations. These officials can provide helpful insight into the environmental health implications of policy and regulatory decisions.

Common ways to build the capacity of health professionals are to offer them continuing education units,[49] to involve them directly as partners at the commencement of a PEPH program, to provide literature for use in their offices, and to develop talking points for them to pass on to patients.

Health professionals might benefit from capacity building in the following areas:

- Environmental health principles and approaches.
- Exposure reduction approaches.
- Risk assessment and communication.
- Project assessment and evaluation.
- Other professional development related to environmental, public, and community health.

## Decision-makers

Many environmental public health prevention and exposure reduction strategies can call for developing new policies or regulations at the local and national level. Therefore, the capacity of decision-makers can be a top priority in PEPH programs. PEPH partners can create materials and resources targeted at decision-makers to assist them in better understanding the interaction between environmental exposures and human health.

Decision-makers include:

- Elected and non-elected officials and government employees at local, state, regional, and federal levels.
- Regulators, such as staff at the Environmental Protection Agency, the Food and Drug Administration, the Consumer Product Safety Commission, or their state counterparts.
- Local leaders, including school principals, school board presidents, and tribal council members.

Decision-makers may benefit from skills and knowledge in the following areas:

- Environmental health and environmental science literacy.
- Exposures and how they can occur.
- Costs saved through environmental disease prevention.
- Community-based concerns.
- Individual research projects and findings that might provide evidence and inspiration to policy change.
- Networking skills to provide access to environmental public health experts whom decision-makers can call on for information (for example, regulators might need to know who the university subject matter experts are that they can consult if they have questions, as well as how to locate information on environmental public health).



[49] For example, the American College of Preventive Medicine offers an annual Board Review Course that covers all areas of preventive medicine, including Biostatistics, Epidemiology, Health Services Administration, Occupational Medicine fundamentals, Environmental Health, Injury Epidemiology and Prevention, Clinical Preventive Services, Chronic Disease and Infectious Disease, and Behavioral Medicine.

Building the capacity of decision-makers is related to building the capacity among community organization members, researchers, and health professionals to understand and inform policy issues.

These groups might need training to:

- Understand how the legislative process works, for example:
  - Where and when local elected officials meet.
  - How topics are added to meeting agendas.
  - What local official to contact.
  - How decisions are made at the state level.
  - How often, where, and when state decision-making meetings take place.
  - Which state lobbyists can affect environmental policies.
- Understand the best method of communicating to and with decision-makers, including not only environmental public health information research findings, but also the best way of communicating community concerns.
- Understand how to encourage decision-makers to enact change.

## A Capacity Building Logic Model

This model identifies potential activities, outputs, and impacts of successful capacity-building strategies.

- Activities are actions that are based on available inputs to build capacity.
- Outputs are the direct products of capacity-building activities.
- Impacts are benefits or changes resulting from the activities and outputs (ultimate or long-term impacts are also examined in Chapter 7: Principles of Evaluation).

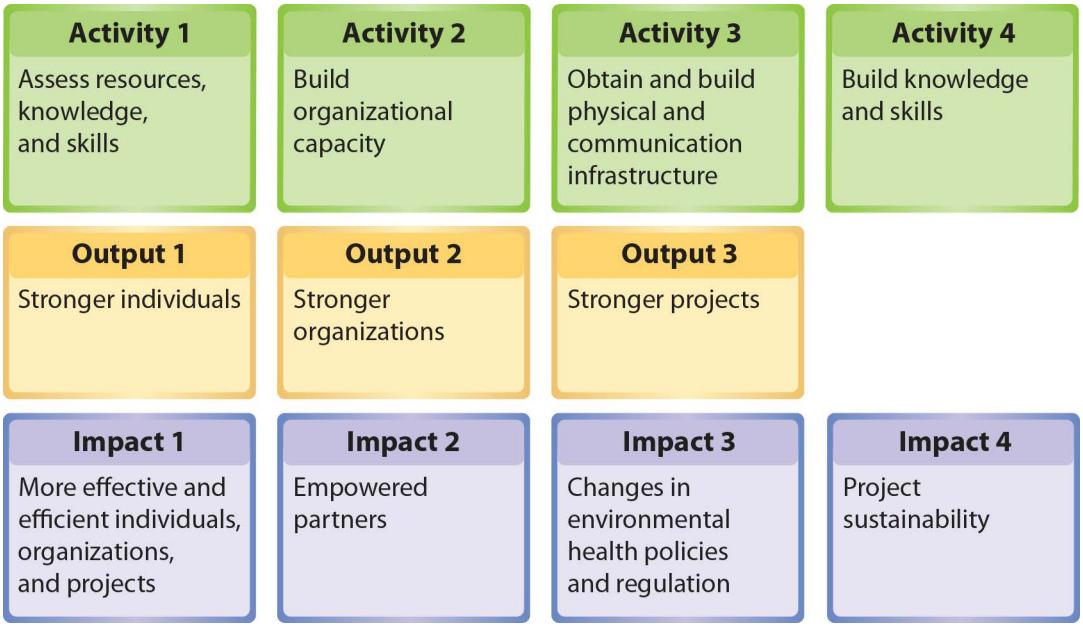


Grantees can use this chapter to brainstorm other activities, outputs, and impacts that are applicable to their specific projects. This model contains three major components:

We developed the logic models in this Manual recognizing that grantees reflect a wide range of experience and capacity. Some grantees have been funded for more than 20 years, while others are just getting started. In general, the logic models show increasing levels of maturity from left to right and from top to bottom. Additionally, projects might not necessarily adhere to or exhibit all of the elements of the model.

Ideally, anyone working to build capacity will recognize themselves in one or more of the logic model components. The elements of the model are numbered in Figure 6.1 to provide reference for discussion in the text of this chapter.

**Figure 6.1 Capacity Building Logic Model Framework with Examples of Activities, Outputs and Impacts**




## Sources of Data

Grantees may find the following sources of data to be helpful in tracking achievements related to products and dissemination:

- Activity logs
- Contact logs
- Participant lists
- Feedback forms
- Publication and material development lists
- Meeting agendas
- Telephone logs
- Communication strategies and plans
- Budgets
- Group discussions
- Surveys
- Interviews
- Meeting notes
- Email exchanges
- Internet web logs

For a more comprehensive list of data sources, see **Chapter 7: Principles of Evaluation**.

## Activities

Activities, as shown in the capacity building logic model, are actions that are based on available inputs to build capacity. The logic model example used in this Manual identifies four potential activities for capacity building:[50]

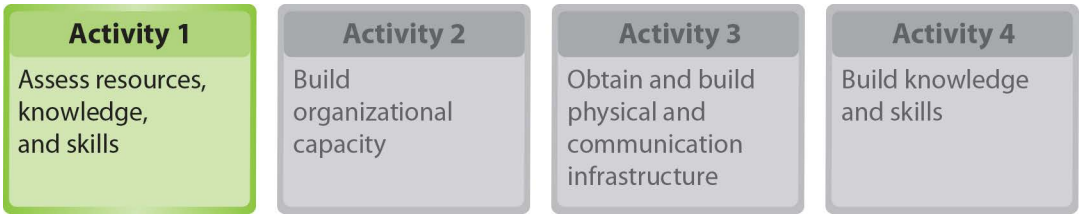
Activity 1: Assess resources, knowledge, and skills

Activity 2: Build organizational capacity

Activity 3: Obtain and build physical and communication infrastructure

Activity 4: Build knowledge and skills

### Activity 1: Assess resources, knowledge and skills




In order to build capacity, partners can assess the resources, knowledge, and skills the project has at its disposal, both on an individual and organizational level. In cataloguing assets and needs, partners can discuss the current project mission, goals, objectives, and funding to gauge where to build capacity.

Specifically:

- What resources, knowledge, and skills do partners possess that they could bring to the project?
- What resources, knowledge, and skills are necessary to complete the PEPH project?



**Resources** are people, infrastructure, and funds grantees can use to accomplish PEPH goals.

**Knowledge** is 1) the theoretical or practical understanding of a subject acquired by a person through experience or education, 2) the facts and information known in a particular field, and 3) awareness or familiarity gained by experience of a fact or situation.

**Skills** are the proficiency, facility, or dexterity that is acquired or developed through training or experience.

[50] For more information on approaches to capacity building, see Crisp BR, Swerissen H, Duckett SJ. 2000. Four approaches to capacity building in health: consequences for measurement and accountability. Health Promot Int 15(2): 99-107.

Partners can begin to answer these questions using the following approaches:

- Gather and analyze ideas from partners and audiences about assets and needs
  - Discuss these assets and needs in roundtable meetings.
  - Administer questionnaires or surveys to assess capacity.
  - Evaluate and analyze findings of programs and services.
  - Document partners' strengths (e.g. see Table 6.1).
  - Conduct outreach and focus groups.
  - Hold public and partner meetings.
- Identify and prioritize critical needs for various partners.
- Assess current capacity required to address needs (for example, community organizations can possess the knowledge that would allow researchers to delineate local living patterns).
- Identify and develop best strategies to meet needs and align them with the goals of the project.

### Metrics for Activity 1: Assess resources, knowledge, and skills

- Description of activities conducted to assess needs and resources.
- Number and description of resources identified.
- Number and description of partners involved in assessment activities.
- List of current capacities.
- List of identified capacity needs.
- Description of strategies to address gaps.
- Number and description of project strategy reviews.
- Number and description of revisions to the project plan.

## Table 6.1 Example Balance Sheet of Resources, Knowledge, and Skills for Partners[51]

| Partner Group | | |
|---|---|---|
| **Community Organizations** | **Current Capacity** | **Needed Capacity** |
| | **Knowledge:** Knows the community's health problems and understands how community interacts and functions<br>**Resource:** Existing organizational structure, such as a coherent identity, existing membership, etc. | **Knowledge:** How to conduct research to reduce environmental exposures of concern<br>**Resource:** Procedures that help define the community as a unit of identity<br>**Resource:** Funding to conduct research to reduce exposures |
| **Researchers** | **Current Capacity** | **Needed Capacity** |
| | **Knowledge:** Environmental health risks and indicators<br>**Skill:** Experience in applying for and receiving funding<br>**Resource:** Access to management infrastructure for grant administration | **Resource:** Relationships with community members<br>**Knowledge:** Community dynamics |
| **Health Professionals** | **Current Capacity** | **Needed Capacity** |
| | **Knowledge:** Understands local health complaints and has access to community health data<br>**Resource:** Health clinics available to treat and diagnose individuals who have been exposed to an adverse environmental agent | **Resource:** Funding to conduct interventions<br>**Knowledge:** Environmental exposure science<br>**Skill:** Experience with environmental exposures and interventions |
| **Decision-Makers** | **Current Capacity** | **Needed Capacity** |
| | **Resource:** Networks with other decision-makers<br>**Knowledge:** Understands the regulatory system | **Knowledge:** Awareness of environmental health risks in the communities<br>**Resource:** Networks with experts and community members experienced with environmental exposures and interventions |

[51] Adapted from, Centers for Disease Control and Prevention (CDC). 2008. State Asthma Control Program Evaluation: Reference materials for designing and implementing evaluations, Module 1: Partnerships, Draft.

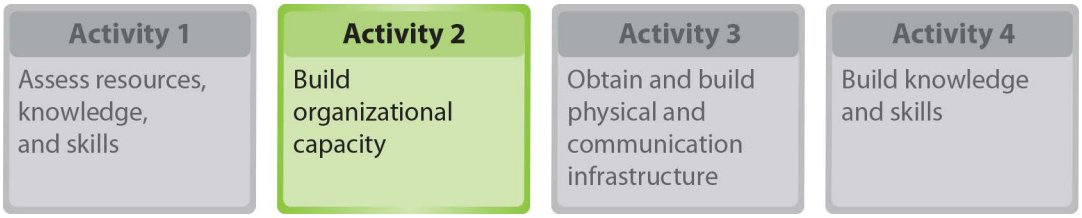
**Metrics in Action 6.1:** The **Promoting the Occupational Health of Indigenous Farmworkers Project** is a collaboration among the Oregon Law Center, Salud Medical Center, *Pineros y Campesinos Unidos del Noroeste* (Northwest Treeplanters and Farmworkers United), Portland State University School of Community Health, and Farmworker Justice. The Project conducted surveys in 2008 and 2009 to assess the occupational and health needs of indigenous farmworkers from Mexico and Guatemala working in Oregon versus Latino farmworkers. The indigenous workers are not of Latino descent; they speak distinct languages and have unique cultural perspectives. The farmworker survey was part of a larger plan to identify the workers' occupational health concerns and develop community-based strategies to address these needs.

Based on the findings of the survey, the researchers proposed "employing more people who speak indigenous languages as organizational leaders, interpreters, and health workers to help reduce some of the linguistic and cultural barriers to occupational safety training and other health and social services identified in this study." To address this need, they developed an approach to train the farmworkers as promotores (health promoters). They used linguistically and culturally appropriate educational materials, and they worked with the farmworkers to advocate for healthier working conditions. By assessing the resources, knowledge, and skills among the indigenous farmworker population, the project enabled the farmworkers to build the necessary capacity to meet their community needs.

**Metrics to assess resources, knowledge, and skills:**

- Description of activities conducted to assess needs and resources: *The project conducted a survey of indigenous farmworkers to identify needs and resources.*
- Number and description of partners involved in assessment activities: *Five local organizations participated in the partnership: Oregon Law Center, Salud Medical Center, Pineros y Campesinos Unidos del Noroeste (Northwest Treeplanters and Farmworkers United), Portland State University School of Community Health, and Farmworker Justice.*

## Activity 2: Build organizational capacity




Some organizations start from scratch and need to begin with building basic organizational structures. Others have existing frameworks that some partners have to learn to navigate. Writing down policies and procedures can help establish and transfer institutional knowledge, and it can contribute to organizational stability as well. Obtaining and building organizational capacity can also increase partners' abilities to accomplish their goals. For example, developing operating norms and procedures that promote mutual respect and appreciation for differences can encourage participation and facilitate effective partnerships.[52] In addition, continuous participation by partners and involvement of new individuals and groups can lead to greater retention of staff and an increase in interest, motivation, and creativity among partners. Examples of approaches to building organizational capacity include:

- Expanding and supporting the workforce by:
  - Recruiting and hiring employees.
  - Mentoring staff and participants.
  - Growing a volunteer program.
  - Securing expert support.
- Defining organizational hierarchy and roles by:
  - Forming the basic structure of an organization (for example, bringing together community members with similar goals to form a community organization).
  - Establishing lines of communication (for example, creating an email account for the organization, checking it regularly, and ensuring other community members know the address).
  - Creating a directory of participants and an organizational chart.
- Setting up procedural infrastructure by outlining how to:
  - Manage nominations and the leadership selection process.
  - Write ground rules.
  - Smooth conflicts.
  - Support members.
  - Conduct effective meetings.

Also see **Chapter 2: Partnerships**

[52] Israel BA, Schulz AJ, Parker EA, Becker AB. 1998. Review of community-based research: Assessing partnership approaches to improve public health. Annu Rev Publ Health 19: 185.

## Metrics for Activity 2: Build organizational capacity

**Community Organizations**

- Description of bylaws, leadership voting process, and conflict management procedures.
- Number of community organization members involved in evaluation of PEPH project activities.
- Number of outside experts hired or brought in to help community conduct PEPH activities.
- Number of products to disseminate environmental public health information to communities.
- Number of grants applied for with a community member as a principal investigator (PI).

**Researchers**

- Number of disciplines and training backgrounds represented by researchers.
- Number of researchers involved in interactions with other partners.
- Number of research partners on a community advisory board (CAB) and description of interests represented by each.
- Number of employees paid by the researcher for participating in the project.
- Number of researchers who have completed Institutional Review Board (IRB) training or have experience in obtaining IRB approval.
- Description of improvements in researchers' grant management, budgeting, or financial skills.

**Health Professionals**

- Description of organizational structures and policies that facilitate and enable health professionals to participate in community research.

**Decision-Makers**

- Number of people interested in environmental public health issues on phone or email lists (either created by decision-makers or provided by community organizations).
- Number of volunteers recruited to take environmental public health messages back to their communities.

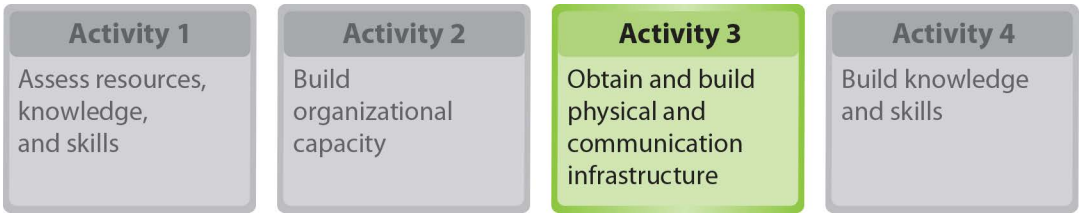
**Metrics in Action 6.2:** The **University of Texas at El Paso** established the Encuentros: Binational Community Lead Project Project to assess lead exposure among the children of the El Paso, Texas/Juarez, Mexico, binational community using a participatory-based research approach. One of the primary study objectives was to involve the community in the research process and the creation of the prevention and intervention strategy to reduce lead exposure.

The project leaders partnered with several community organizations, including Adults and Youth United Development Association (AYUDA), *Organizacion Popular Independiente* (OPI), and *Salud y Desarrollo Comunitario* (SADEC). Together these groups engaged in activities to increase the community's capacity to deliver environmental health intervention, prevention, and educational services in a binational setting. The researchers built upon a preexisting framework from an earlier EPA study, incorporating new partners into the organizational hierarchy. The project team set up new procedural infrastructure by joining environmental health scientists and community organization members in an interdisciplinary investigative team. With organizational capacity in place, the research team went on to evaluate lead exposure and its adverse effects on the health of low-income Hispanic children living near the U.S.-Mexico border.

**Metrics for building organizational capacity:**

- Number of community organization members involved in evaluation of PEPH project activities: *Each of the three primary partners had a minimum of X people involved in the project.*
- Number of disciplines and training backgrounds represented by researchers: *In addition to the community groups, the partnership also included environmental health scientists.*

## Activity 3: Obtain and build physical and communication infrastructure




Physical infrastructure is the basic equipment and building space needed for the operation of a PEPH project. Communication infrastructure is the foundation for an organization's data, voice, and video systems. Examples of approaches to building organizational and communication infrastructure include:

- Building or maintaining physical infrastructure:
  - Spaces for meetings
  - Equipment (such as computers, telephones, emails, and supplies)
  - Research tools
  - Computer access
- Creating and maintaining communication infrastructure by setting up:
  - Directory and rosters
  - Email listservs
  - Website forums

### Metrics for Activity 3: Obtain and build physical and communication infrastructure

- Description of space and other physical structures obtained.
- Number and description of directories, rosters, or listservs created/obtained.
- Number and description of other resources obtained.
- Number and amount of other funding sources.
- Description of meeting space obtained.
- Number and description of supplies obtained.
- Number of grant applications submitted.
- Number of grants awarded.
- Number and description of non-grant resources and materials obtained.

**Metrics in Action 6.3:** NIEHS formed the **Superfund Research Program** (SRP) in 2002 to "increase the understanding of different remedial options, in order to optimize the protectiveness to the environment and human health and the cost-effectiveness of remedial decisions." As part of its training program, SRP conducts interactive, web-based "Risk eLearning" seminars in collaboration with the U.S. Environmental Protection Agency (EPA). SRP built its communication capacity by partnering with the EPA to use its technical infrastructure and large distribution network to broadcast information on innovative technologies for testing and cleaning up contaminated sites. The webinars disseminate new remediation techniques and the "state of science" to a target audience of on-the-ground personnel: EPA risk assessors, regional project managers, state and local regulatory agencies, environmental engineering and consulting firms, and academia.

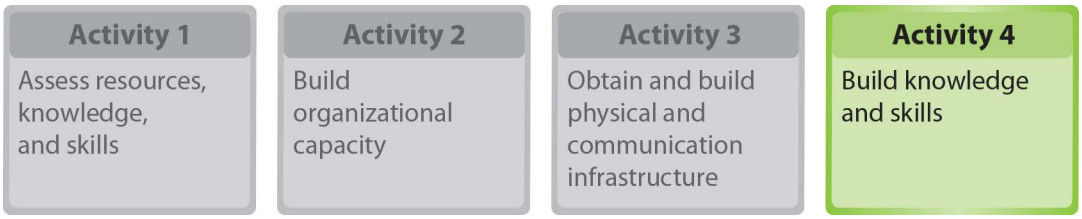
By sharing assets and infrastructure SRP is able to provide both free and timely information to the target audience. SRP also partners with diverse EPA programs that sponsor topics of interest to their missions and with expert speakers from the academic, private, and government sectors. The EPA also provides use of its Hazardous Waste Clean-Up Information (CLU-IN) website to host and archive the Risk eLearning events. The program uses the archived seminars and an online participant feedback form to evaluate event participation and to determine the presence of a learning outcome.

**Metrics for obtaining and building physical and communication infrastructure:**

- Description of other resources obtained: *SRP uses EPA's webinar technology six to eight times per year to distribute information about testing and remediation of contaminated sites.*
- Number and description of other directories, rosters, or listservs created/obtained: *SRP uses EPA's broad distribution network (electronic directory) and its Hazardous Waste Clean-Up Information (CLU-IN) website to host and archive the Risk eLearning events.*

For more information about the SRP Risk eLearning program, visit: https://niehs.nih.gov/research/supported/srp/events/riskelearning.

## Activity 4: Build knowledge and skills




Expanding knowledge and skills is an integral part of building capacity of individuals and organizations in a PEPH project. Knowledge is 1) the theoretical or practical understanding of a subject acquired through experience or education, 2) the facts and information known in a particular field, and 3) awareness or familiarity gained by experience of a fact or situation. Skills are the proficiency, facility, or dexterity that is acquired or developed through training or experience. To strengthen skills, individual partners and participants might need to learn first about environmental public health.

Capacity building involves enhancing the knowledge and skills of the individuals within an organization, as well as developing the knowledge and skills of others in the community. Partners can use many approaches to build their knowledge and skills within PEPH projects. These include:

- Knowledge and skills development
  - Mapping knowledge repositories (databases, bookmarking engines, etc.).
  - Creating or maintaining expert directories (facilitates access to experts).
  - Learning from other projects and reviewing lessons learned.
  - Measuring and reporting intellectual capital.
  - Utilizing collaborative technologies (groupware, etc.).
- Training
  - Participating in formal and informal education and training.
  - Developing and delivering site-specific training for instructional staff and partners.
  - Testing the knowledge of participants with quizzes or tests.
  - Training knowledge brokers (some organizational members take on responsibility for a specific "field" and act as first reference for discussing a particular subject).
  - Forming master-apprentice or mentoring relationships.
- Research
  - Recruiting and training volunteers to assist with research, e.g. home health workers, community-based outreach workers.
  - Involving partners in multiple stages of research.

**See Chapter 5** for more information on education and training.

- Research *(continued)*
  - Developing specific research techniques and approaches (e.g., behavioral, statistical, epidemiological, or toxicological approaches; biomonitoring, modeling, survey design/analysis, outreach, communication, or environmental sampling techniques).
  - Providing cross-disciplinary training opportunities.
- Outreach and communication
  - Understanding and meeting the needs of other partners.
  - Translating messages and findings to different audiences.
  - Encouraging storytelling as a means of transferring tacit knowledge.
  - Communicating with the media.
  - Hosting a speaker series.
  - Hosting meetings and providing letters of introduction for various partners.
- Grant writing and management
  - Formulating research questions, specific aims, technical expertise, and other components for writing a clear, fundable proposal.
  - Budgeting and fiscal management of grant funds.
  - Understanding administrative requirements of grants, which might include institutional review board (IRB) training, calculating facilities and administrative costs, or obtaining a DUNS number (a data universal numbering system used to track payments).
  - Learning how to track project-specific progress and document success.
  - Recording processes and results so that institutional memory loss is kept to a minimum after key personnel depart.
  - Planning for grant renewals in sufficient time to avoid funding gaps.
  - Locating alternative sources of funding, such as individual donations, conference fees, membership dues, and private foundation grants.
- The policymaking process
  - Communicating effectively with decision-makers.
  - Providing scientific data in appropriate formats.
- PEPH project skills
  - Learning ways to sustain PEPH project effects and maintain partnerships, skills, and resources.
  - Increasing the scope and impact of a PEPH project through engagement of new partners.

Building knowledge and skills capacity typically focuses on organizational objectives such as improved performance, innovation, the sharing of lessons learned, integration, and continuous improvement of the organization. This approach can help individuals and groups share valuable organizational insights, avoid redundant work, reduce training time for new employees, retain intellectual capital as employees leave the organization, and adapt to changing environments and markets. Many of the activities can lead to the creation of communities of practice,[53] the transfer of best practices, familiarity with key data sources and their strengths and limitations, and the use of environmental health information as a foundation for identifying needs and setting priorities.

### Metrics for Activity 4: Build knowledge and skills

- Number of classes, workshops, and other training sessions offered or attended.
- Description of new skills obtained.
- Results of pre- and post-test questionnaires measuring changes in knowledge and skills.
- Description of efforts undertaken to share information among PEPH project partners.
- Number of papers published in non-academic outlets – for example, newspapers, newsletters, or online forums.
- Number of forums where community members and health professionals meet to discuss environmental public health concerns (sponsored by PEPH partners).
- Number of decision-makers who attend environmental public health seminars and workshops.
- Number of comments and recommendations by decision-makers on safety or other protocols.
- Number of environmental public health regulatory changes introduced by decision-makers.
- Number of researchers or community organization members invited to policy meetings.



[53] A group of people who share an interest, art or profession. Wenger E. 1998. Communities of Practice: Learning, Meaning, and Identity. Cambridge: Cambridge University Press.

**Metrics in Action 6.4:** The **Deep South Center for Environmental Justice (DSCET)** at Dillard University (DSCEJ) and the United Steel Workers (USW) partnered in 2005 to develop the "Safe Way Back Home" project to help New Orleans residents displaced by Hurricane Katrina. The project team built knowledge and skills in the community by providing health and safety training and appropriate protective equipment to community residents, local business owners, and other volunteers.

From 2006 to 2009, more than 650 people received remediation training and utilized their new knowledge and skills to clean more than 60 yards and two schools. Because of this training, the residents were able to safely remove contaminated soil, pressure-wash sidewalks, and revitalize the landscapes in their neighborhoods, thus beginning the difficult task of rebuilding their community after the disaster. The project participants also gained knowledge about how to recruit community members and policymakers through events that highlighted community service and self empowerment. For example, their 2006 showcase block party, celebrating the transformation of Aberdeen Road, garnered new support from policymakers.

**Metrics for building knowledge and skills:**

- Number of classes, workshops, and other training sessions offered or attended: *Trainings were offered in six neighborhoods, with more than 650 people participating in them.*
- Description of new skills obtained: *Residents were trained in soil remediation and landscaping, and in community building as well.*



## Building Researcher Capacity for Involving Tribal Governments and Members in Environmental Public Health Research and Outreach

Some environmental public health research or outreach projects may involve Native American communities and tribal governments, also known as American Indian/Alaska Natives (AI/AN). There is a special political relationship between the United States and AI/AN governments – as defined by treaties, statutes, court decisions, presidential memoranda, and the United States Constitution – that differentiates Native American governments from other interests and constituencies.

One way to build organizational capacity is to ensure that researchers are aware of cultural differences and expectations when working with tribal partners. For example, tribal populations operate as sovereign government entities, and researchers need to be prepared to work with these partners in a manner that respects this independence. In addition to thinking about how the metrics provided in this capacity building chapter can be applied to working with tribal partners, we have gathered input from those who work with tribes about how to build capacity for developing lasting relationships with tribal partners.

When working with tribes, environmental public health researchers or outreach professionals will want to be sensitive to each tribe's history and culture, as each of the more than 560 federally recognized tribes is distinctive. To be successful in engaging Native American communities, in either research or outreach endeavors, grantees should take time to learn about the tribal governmental structure and the culture of their partners. This will ensure that project activities are beneficial to the community as well as the academic researchers. Researchers should also include any costs associated with the tribal partnership in the grant budget. Tribes are one of several groups that historically have been marginalized in the United States, so paying particular attention to their needs, listening to their advice, giving them a voice, and reporting findings to the community before publication is especially critical.[54]

Most tribes also have a process in place to review and approve human research within the tribal community. The review process may be a tribally constituted Institutional Review Board (IRB), an Indian Health Services IRB, or a review by the tribal council. Researchers who plan on working with tribal communities should ask tribal leaders for guidance on the review processes in place, the timelines for reviews, and the processes for proceeding with research activities upon approval. Tips for working with Native American individuals, organizations, and governments include:[55, 56]

- Understand the unique relationship between Native Americans and the United States government. It is a political relationship – not race-based.
- Take the time to identify the appropriate contact. Your initial contact with a tribal organization should be with someone at a technical or administrative level. That contact will provide you with the proper guidance about whom to contact and by what methods.
- Because of historical precedent, Native Americans may be suspicious of outsiders and their ideas.
- Do not assume one tribe or one leader speaks for all.
- Work with key tribal representatives to identify activities, problems and challenges that the tribe is interested in addressing; issues may be raised by tribal governments, federal staff, or national and regional tribal partnership groups.
- Offer tribal representatives the opportunity to provide meaningful input and involvement.
- Native Americans object to being "consulted" or "studied" by people who have little intention of doing anything in response to their concerns. Be prepared to negotiate to find ways to accommodate the tribe's concerns. Be prepared to respond with reasons why you may or may not follow advice provided.
- Those you work with might not be able to answer questions immediately. They may need to think about it and consult with others.
- Most tribal governments are not wealthy, and it may be difficult for tribal officials to attend meetings or to exchange correspondence. In addition, tribal governments, in general, do not have large support staff to assign to meetings, follow-up, etc.

[54] Dixon M, Roubideaux Y. 2001. Promises to Keep: Public health policy for American Indians and Alaska Natives in the 21st century. 142-143. Washington, DC: American Public Health Association.

[55] Minnesota Indian Affairs Council. 2011. Protocol When Working with Tribes.

[56] American Indian Environmental Office (AIEO), U.S. Environmental Protection Agency (EPA). 2011. Policy for Consultation and Coordination with Indian Tribes. 1. Available: *https://www.epa.gov/tribal/forms/consultation-and-coordination-tribes* [accessed 19 January 2021].

- Respect Tribal Council representatives as elected officials of a government. Treat them with the respect you would treat a senator or governor.
- As in all business relationships, honesty and integrity are highly valued.
- After making decisions or plans, provide feedback in a formal, written communication explaining how the tribe's input informed the final action.[57]

**Overall, it is also important to demonstrate respect for tribal governments and members, as it is for any partner. You can show your respect in many ways:**

- Remember that you are a guest of the tribe that you are visiting and conform to tribal customs and laws.
- Be willing to admit limited knowledge of tribal culture, and invite tribal members to educate you about specific cultural protocols in their community, as well as their relationships with the environment and science. When in doubt, do not make assumptions; rather, ask respectfully.
- Listen and observe more than you speak. Learn to be comfortable with silences or long pauses in conversation. Tribal communities consider any interruption highly disrespectful, and interrupting during a conversation may undermine your credibility.
- Clarify environmental public health jargon, acronyms, and standard operating procedures that, while perhaps commonplace for academic researchers or outreach professionals, may not be familiar to partners. Adjust presentations accordingly without being patronizing, using a "plain language" approach (http://www.plainlanguage.gov/).

Many tribal members speak English as a second language; according to the U.S. Census Bureau, 25% of Native Americans speak a language other than English at home.[58] Cross-cultural communication may be more challenging than typical conversations if dominant-culture members assume that the elements of their own culture are clearly understood by everyone. Being sensitive to possibilities for such misunderstandings and seeking clarification in a patient and respectful manner can assist in bridging gaps in cross-cultural communication. In addition, although researchers may want to conduct research that they believe will help Native communities, tribal groups may reject requests for collaboration because they have different priorities. Researchers should respect these tribal decisions.

Tribal traditions often require that tribal leaders deliberate extensively and consider the long-term consequences of their decisions. This approach may contrast with the time frames of environmental public health researchers and EPH projects. Moreover, tribal leaders may only meet at set times of the year, so researchers should be aware of these schedules and allow plenty of time for tribal decision-making.

[57] Ibid.

[58] The Knowledge Portal. 2011. Working Effectively with Tribal Governments: Cross-Cultural Communication.

Researchers should also be aware that tribes, like other governmental bodies, experience changing priorities with changing administrations. These changes may occur at the tribal council or government level, but also within boards and community organizations. Because these relatively small populations are essentially trying to staff the full structure of governance, what may appear to be small changes in the surrounding economy, climate, social structure, etc. can cause major shifts in their limited resources, both human and financial. Researchers can stay informed of the broader political and socio-economic picture within the tribe by reading the local tribal press and listening to tribal radio broadcasts, which are available in many areas. The information from these sources will enable researchers to think about how their work fits into the larger picture of tribal priorities and to anticipate and modify their process and objective to ensure that a respectful partnership continues.

Templates for formal agreements are available from many sources.

Finally, if researchers intend to disseminate any data or materials, they should work directly with the tribal community to develop a formal, signed agreement that provides details of the goals of the projects, defines the outputs and outcomes, and specifies the roles and responsibilities of all partners. This includes explicit details about who "owns" data, what types of analyses will be conducted, how findings and conclusions will be developed, what approval procedures are needed to publish results, and any other issues where assumptions that may have unintended consequences should be made explicit.

Researchers will want to learn about a potential partner's history, government, and culture and then begin to engage a partner in a respectful and just manner, as they would with any other community partner. It is not enough to merely obtain tribal input on an issue. Tribes must have appropriate, timely, and meaningful involvement in research projects. In the end, only direct interactions, experiences, and personal relationships will build the understanding necessary to include tribal governments and members equitably in environmental public health research and outreach endeavors.

**The following sources provide additional information about working with tribal governments:**

- National Congress of American Indians Policy Research Center.
- The Native American Policy of the U.S. Fish and Wildlife Service. Available: http://www.fws.gov/southwest/NAL/docs/NativeAmericanPolicy%5B1%5D.pdf [accessed 19 January 2021].
- U.S. Fish and Wildlife Service. Working with Tribes in the Midwest Region to Fulfill Our Federal Trust Responsibilities. Partnerships with Native Americans.
- U.S. Department of the Interior, National Park Service. Resources for Federal Agencies.
- Working Effectively With Tribal Governments.

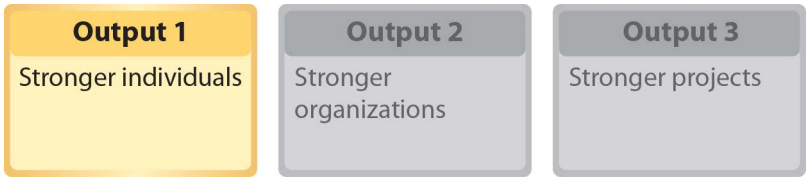
## Outputs

Increased capacity can lead to improved ability of a person, group, organization, or system to meet its objectives or perform better. Subsequently, increased capacity increases the likelihood of improvements in community health. Outputs are the direct products of capacity-building activities. Using metrics to measure outputs provides an assessment of the strengths and weaknesses of the program and its capacity.

We identify in this chapter three possible outputs that can result from activities that build capacity:

- Output 1: Stronger individuals
- Output 2: Stronger organizations
- Output 3: Stronger projects

### Output 1: Stronger individuals




Members of a partnership who participate in capacity-building activities will become more informed, better trained, and stronger partners. Researchers who improve their interpersonal skills might find that community members are more willing to participate in their research. Health professionals who are familiar with environmental health literature are more likely to share this information with patients, as well as to seek feedback to determine how their health is being affected. Decision-makers who meet with community members, researchers, and other experts about environmental exposures can call upon these individuals and their organizations to provide testimony to encourage policy changes.[59] Possible outputs of greater levels of competence across all groups include improved skills in information gathering, collaboration, decision-making, and communication, as well as increased interdisciplinary interactions. For example, a researcher who becomes acquainted with cultural norms of a certain community of people can begin to have more productive interactions with members of that community.

Possible approaches to assessing the increased strength of individuals include:

- Periodic assessments of the capacity needs of partners.
- Pre- and post-testing for trainings and other self-evaluation tools.[60]
- Comprehension tests for partners of environmental science information.
- Surveys and discussions regarding the progress of projects and partners.

[59] Orians C, Rose S, Hubbard B, Sarisky J, Reason L, Bernichon T, et al. 2009. Strengthening the capacity of local health agencies through community-based assessment and planning. Public Health Rep 124: 879.

[60] Centers for Disease Control and Prevention (CDC). 2010. Health Impact Assessment. Available: *https://www.cdc.gov/healthyplaces/hia.htm* [accessed 19 January 2021].

## Metrics for Output 1: Stronger individuals

**All Partners**

- Description of established core competencies.
- Results of self-evaluation or other assessments of skills.
- Measures of competency from pre- and post-project testing of abilities.

**Community Organizations**

- Number of other community members mobilized.
- Number of grants applied for and received.
- Number of grants that have a community organization member as a principal investigator (PI).

**Researchers**

- Description of improvement in interpersonal skills.
- Number of relationships with community members, health professionals, decision-makers, and other researchers.
- Description of the effectiveness of translated materials for different audiences.

**Health Professionals**

- Number of patients provided with environmental public health information.
- Assessment of ability to fulfill public health core competencies.

**Decision-Makers**

- Description of participation in PEPH project meetings or forums.
- Number of environmental public health issues presented to the public.

For more information on core competencies for environmental health practitioners, see the following resources: 1) "APHA Core Environmental Public Health Competencies," and 2) CDC-Environmental Health Competency Project: Recommendations for Core Competencies for Local Environmental Health Practitioners **https://www.cdc.gov/nceh/ehs/Corecomp/Core_Competencies_EH_Practice.pdf** [accessed 19 January 2021].

**Metrics in Action 6.5:** The Native TEACH Partnership is a collaborative project between the Northwest Indian College (NWIC) and the **University of Washington (UW) Center for Ecogenetics and Environmental Health Community Outreach and Ethics Core**. The partnership arose from a mutual interest in exploring what tribal college students think about the field of environmental health. The project participants used a combination of talking circles and written surveys to explore concepts unique to Native American environmental health science.

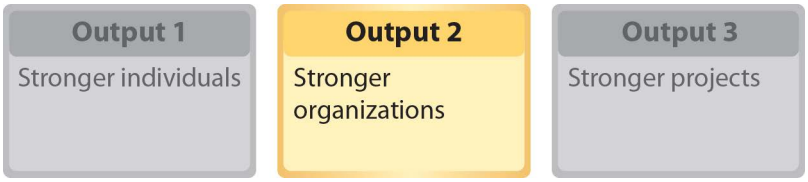
Students from UW and NWIC who were involved in the project also played an integral role in research planning, implementation, and data evaluation. Through their participation, they have increased their understanding of environmental public health issues and their capacity to conduct scientific research. The American Indian Higher Education Consortium (AIHEC) recognized the benefits of this project and allowed Native TEACH to administer their survey at the AIHEC 2009 Student Conference, significantly increasing the scope and reach of the research project.

Researchers and community members also benefited from an increase in communication and a greater understanding of cultural norms. Through a combination of traditional Native American storytelling and mainstream scientific communication methods (charts, graphs, and maps), project leaders shared their findings with tribal college and university communities, environmental public health professionals, Native American health researchers, and tribal elders.

**Metrics for stronger individuals:**

- Description of established core competencies: *Through their participation, tribal college students have increased their understanding of environmental public health issues and their capacity to conduct scientific research.*
- Description of improvement in interpersonal skills: *Researchers and community members also benefited from an increase in communication and greater knowledge of cultural norms.*

## Output 2: Stronger organizations




Another potential output of capacity building is stronger organizational structures available to support the project or its constituent partners. Stronger organizations offer partner organizations greater knowledge, skills, infrastructure, and resources on which to rely, as well as greater organizational sustainability. For example, community organizations can set up meeting spaces in their own name, which makes the name recognizable to the community, produces regular membership lists, and establishes an organizational identity for the community.

Research organizations can create governance rules for the collaboration of researchers and other partners in the research process, resulting in established structures (such as community advisory boards) for collaborating with communities. Health professional organizations can initiate curricula to provide health professionals with environmental public health training. Decision-maker organizations that have consortium agreements with researcher, health professional, or community organizations can have a greater collective awareness of the need for environmental public health regulation and can therefore initiate more discussions on environmental public health concerns.

## Metrics for Output 2: Stronger organizations

**Community Organizations**

- Description of community organization governance rules and how they are enforced.
- Existence and use of membership lists to communicate with members.
- Number of members in the community organization.
- Descriptions of physical buildings and equipment available to the community organization.
- Description of financial stability/sustainability of organization.

**Researchers**

- Description of community advisory board members and their roles and contributions to the project.
- Number of times the community advisory board weighs in on project decisions.
- Number of projects receiving institutional review board (IRB) approval.
- Description of financial stability/sustainability of research project.

**Health Professionals**

- Number of health professionals partnering with environmental health projects.
- Number of environmental public health courses or workshops required for board certification.
- Number of health professionals specializing in environmental public health.

**Decision-Makers**

- Description of the diversity of decision-makers' staff.
- Description of changes in political support for environmental public health interventions.
- Number of environmental public health consortium agreements with researchers, health professionals, or community organizations.

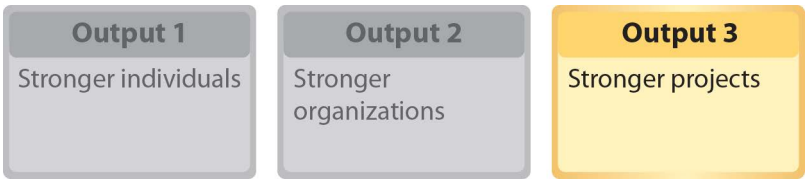
**Metrics in Action 6.6: Concerned Citizens of Tillery (CCT)** is a community-based organization that has promoted social justice and self-determination for rural African American communities since 1978. A prime example of organizational growth and strength is the development and sustainability of the North Carolina Environmental Justice Network (NCEJN) and its annual EJ Summit. The NCEJN began as a project within CCT and has become its own independent nonprofit organization. NCEJN's mission is to promote health and environmental equality for all people of North Carolina through community action for clean industry, safe workplaces, and fair access to all human and natural resources. They focus on organization, advocacy, research, and education based on principles of economic equity and democracy.

NCEJN has established several structures to collaborate with the community. It holds quarterly meetings in several counties in North Carolina that bring groups and individuals together from across the state to discuss and act on items that affect communities suffering from environmental injustices. Each year, more than 250 people attend these meetings, bringing the issues of environmental justice to the forefront of several local newspapers. In October 2007, NCEJN held the 9th Environmental Justice Summit, entitled "Head 'em Up – Move 'em Out: Landfills & Hogs." More than 125 community members, elected officials, researchers, and students attended and participated in scientific presentations, workshops, and plenary sessions. The sheer number of participants in this organized conference activity demonstrates the significant organizational strength of NCEJN.

**Metrics for stronger organizations:**

- Number of members in the community organization: *250 people attend CCT's annual meeting.*
- Description of financial stability sustainability of organization: *CCT has obtained more than $XXX,XXX in funding from five different sources to ensure a diverse funding stream.*

## Output 3: Stronger projects




A third possible output of capacity building is that a project itself is strengthened, and thus has a more solid foundation on which to begin or continue environmental public health projects and activities. This might mean that partners engage in more effective and efficient PEPH projects and environmental public health interventions. For example, partners work to coordinate activities, thereby reducing duplication of services and using resources wisely in addressing environmental public health issues.

Approaches to measuring the strength of a project can include talking to partners to gain their input. Assessments of the coordination of the project, communications among partners, and increased educational opportunities can also be important. A strong foundation can in turn lead to stronger partners and organizations (Outputs 1 and 2). Regular project assessment and progress check-ins by partners can also improve processes, facilitate best-practice tracking, provide an accounting and description of accomplishments from the project, and identify strengths of the projects and partners.

### Metrics for Output 3: Stronger projects

- Description of knowledge, skills, infrastructure, and resources of individual and organizational partners.
- Measures of changes in the knowledge, skills, infrastructure, and resources of individual and organizational partners.
- Description of improved efficiencies.
- Description of the level of coordination of partners.
- Description of a project's ability to respond to contextual factors such as budget restrictions, administrative rules, etc.
- Measures of project progress toward goals.

## Impacts

Impacts are benefits or changes resulting from the activities and outputs. We identify the following four examples of impacts that can result from effective capacity-building activities.

- Impact 1: More effective and efficient individuals, organizations, and projects
- Impact 2: Empowered partners
- Impact 3: Changes in environmental health policies and regulation
- Impact 4: Project sustainability

Impacts are more difficult to measure than activities and outputs, in part, because it often takes several years for substantive changes to occur. When thinking about the impacts a project might be able to achieve and how to measure those impacts, it can be helpful to think in terms of short-term and long-term impacts. Short-term impacts are typically those changes that would be expected to see in the first few years of a project. Long-term impacts might not be seen for five or more years. It is helpful for grantees to identify intended impacts so that they can identify measures that will help document their progress in achieving impacts.

Grantees also may be hesitant to claim credit for impacts because other organizations or other contextual factors may have contributed to the changes. While grantees may not be able to claim sole credit for these impacts, it is important to be able to track these broader changes and to document the contributions made by the project to achieving these impacts.

For additional information on long-term impacts, see **Chapter 7: Principles of Evaluation**.

Although there are challenges associated with measuring impacts, tracking progress toward these goals helps grantees stay on track, demonstrate success, and identify areas for improvement. Most importantly, the ultimate goal for capacity building is to produce outcomes and impacts that lead to improvements in health through a reduction in environmental health hazards.[61]



[61] See also, Silka L. 2000. Evaluation as a strategy for documenting the strengths of community-based participatory research. In: Successful Models of Community-Based Participatory Research, 29-31 March 2000: Final Report, Washington, DC. 49-54. (O'Fallon LR, Tyson FL, Dearry A, eds). Available: *https://www.hud.gov/sites/documents/DOC_12485.PDF* [accessed 19 January 2021].

## Impact 1: More effective and efficient individuals, organizations, and projects


**Effectiveness** is the extent to which an activity fulfills its intended purpose or function. **Efficiency** refers to accomplishing PEPH activities within a reasonable time frame by making the most of available resources. Projects will become more effective and efficient as capacity is built at all levels: at the project level, within each of the groups or organizations that participate in the project, and finally among the individuals within these groups. For example:[62]

- For **community organizations**, their capacity to manage or assist an effective and efficient project can grow as members become better research partners.
- For **researchers**, increased capacity can facilitate the research process and the effectiveness of PEPH research.
- For **health professionals**, increased capacity may result in a better transfer of environmental health exposure information to patients that they can use to improve their health.
- For **decision-makers**, increased capacity can lead to increased access to relevant information that they can use in policymaking.

Some questions to ask when evaluating the effectiveness and efficiency of PEPH projects:

- How effectively are the overall mission, sub-missions, or core capabilities being met?
  - What do partners or members say about the effectiveness of the project?
  - Are there aspects of the mission or core capabilities that still need to be met?
  - What can the project do to address these?
- How efficient are project processes?
  - Are there steps in the process that could be cut without sacrificing effectiveness or quality?
  - Are there others who could do an aspect of the project more efficiently or for less money?



[62] Hawe P, Noort M, King L, Jordens C. 1997. Multiplying health gains: the critical role of capacity-building within health promotion programs. Health Policy 39: 29-42.

## Metrics for Impact 1: More effective and efficient individuals, organizations, and projects

- Results from surveys that address changes in knowledge, skills, and satisfaction.
- Description of the quality of partnerships, communications, and project management.
- Description of improvements in operations to maximize efficiency.
- Feedback or survey results showing partner satisfaction with project.
- Description of project productivity.
- PEPH activity completion times.
- Description of cost-effectiveness.
- Description of standards or protocols followed, such as "Good Laboratory Practice."

**Metrics in Action 6.7:** The **University of Texas Medical Branch-Galveston (UTMB)** Center to Eliminate Health Disparities (CEHD) provides community education on protection from environmental toxins in Galveston, Texas. CEHD seeks to reduce health inequities by understanding the social determinants of health and then proposing changes in health systems. The program conducts workshops in which the community members prioritize their needs for rebuilding their neighborhoods. The objectives of the workshops are to 1) increase general environmental health and safety literacy, 2) provide a hazards assessment framework within which citizens can realistically appraise risk to self and family, and 3) disseminate information on precautionary measures to minimize exposure and recognize signs and symptoms of exposure-related health effects. By training community members how to reduce environmental risks, the group builds effective individuals who can readily recognize and address risks while they are still manageable.

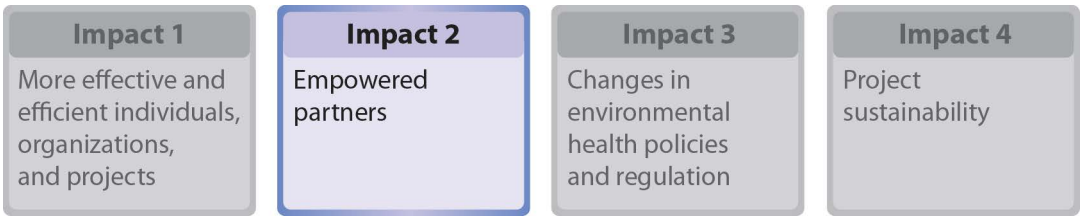
The education programs are developed and implemented in partnership with the NIEHS Community Outreach and Education Core (COEC), St. Vincent's House, the Jesse Tree, and t.e.j.a.s. In an effort to maximize the efficiency of the project, the partners worked together to determine which organization was best capable of providing certain aspects of the training. Partner organizations also regularly provide feedback about any successes or challenges they face with the project activities.

By conducting such a wide variety of capacity-building activities, CEHD ensures that its partner organizations and the individuals who make up those organizations have the knowledge and skills they need to be effective advocates for change.

**Metrics for more effective and efficient individuals, organizations, and projects:**

- Feedback or survey results showing partner satisfaction with project: *The partners regularly provide feedback about any successes or challenges they face with the project activities.*
- Descriptions of improvements in operations to maximize efficiency: *Researchers and community members also benefited from an increase in communication and greater knowledge of cultural norms.*

## Impact 2: Empowered partners




The capacity built through participation in PEPH projects can result in a collective increase in knowledge, expertise and skills that can empower partners to contribute in a unique way both to the specific PEPH project and to environmental public health concerns more generally. Partners and individuals who have actively participated in these PEPH projects have gained knowledge, skills, and abilities that spill over to other projects and areas of their lives. Examples of these additional benefits that empower individuals and organizations in communities could include:

- Greater self-efficacy, self-esteem, and perceived power.
- Creation of marketable skills from the program that are useful in their jobs.
- The ability to engage in conversation and understand policy and community realities.
- Willingness to participate in other research projects.
- Political legitimacy and social status.
- Greater access to resources.
- More meaningful involvement in regulatory and policy discussions.
- Deeper understanding of the research basis for both health and policy recommendations.
- Larger influence over environmental public health concerns through research, outreach, policy change, behavior change, and education.

Empowerment can manifest itself differently for individuals and organizations in the four groups discussed in Table 6.1. For example, research organizations could be empowered by their new partnerships with community organizations to expand collaborations to new groups or address new exposures. Alternatively, individual health professionals could be empowered by their new knowledge of environmental health research to intervene more on their patients' behalf. For decision-makers, empowerment through their new understanding of the environmental health risks affecting their constituents could lead them to build governmental coalitions that attempt to address environmental public health issues.

## Metrics for Impact 2: Empowered partners

- Frequency and magnitude of partner involvement in other partners' activities (such as number of community members who are engaged in researcher's activities or number of researchers who are involved in the creation of public policy).
- Number of individuals in partnerships who speak to government leaders about additional health issues.
- Number of individuals in partnerships who run for city council or other leadership positions.
- Number of partners who speak at conferences on projects of mutual interest to other partners.

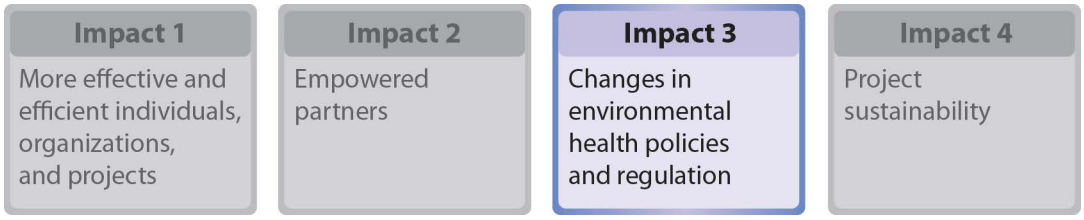
**Metrics in Action 6.8:** The **Brown University Superfund Research Program** teamed up with the Environmental Justice League of Rhode Island (EJLRI) to develop the **Community Environmental College (CEC)**. The mission of the CEC is to empower communities by developing leaders to take action to promote safe and healthy environments for all. The CEC holds a summer program in Providence, Rhode Island, for high school students of all backgrounds. During the summer program, students learn about basic environmental health issues. Brown University students teach eight-week courses, including "Environmental Justice," "Food Justice," and "Leadership, Media and the Arts." The courses incorporate lectures, educational games, field trips, and hands-on community-based projects. For example, students conduct a corner store "makeover," in which the store is redesigned to feature more nutritional food. Students in "Leadership, Media, and the Arts" are taught how to use media to disseminate a message, educate their peers, and become leaders for environmental justice. The students also pick an issue and develop an action plan to address it. Each program provides a student stipend and a certificate at the end of the year. Students who participate in these activities are then prepared to return home and advocate for environmental justice issues that affect their communities.

Students involved with another CEC project write and produce short plays on environmental health themes for public presentation. The CEC also enables Brown University students to develop skills as educators and agents for community change. By educating students and encouraging them to take on leadership roles in their own communities, the CEC program is able to empower partners from underserved communities.

**Metrics for empowered partners:**

- Number of partners who speak at conferences on projects of mutual interest to other partners: *10 students who participated in these trainings created and presented workshops on food justice and environmentally sustainable transportation options.*
- Number of individuals in partnerships who speak to government leaders about additional health issues: *Five students who participated in these activities worked with store owners to increase access to nutritional food.*

## Impact 3: Changes in environmental health policies and regulation




The PEPH program seeks to minimize and prevent adverse health effects from environmental exposures. These PEPH efforts use findings from scientifically robust research to develop solutions that impact public health and policy.

Approaches and techniques for measuring policy and regulatory impacts might include:

- Cataloguing activities related to policy and regulatory efforts.
- Holding meetings specifically to address the topic of collecting evidence of policy and regulatory changes.
- Assessing partners' networks of policy references and relationships.

Policy and regulatory impacts can include:

- Transfer about knowledge of PEPH partnership, communication, and capacity-building skills transferred across projects or consortia to influence policy in other areas.
- Partners working together to affect corporate, institutional, policy, or governmental change.
- Involvement and cooperation of federal partners, such as the Department of Homeland Security, the Occupational Safety and Health Administration, or the Environmental Protection Agency.
-

## Metrics for Impact 3: Changes in environmental health policies and regulation

- Descriptions of networks and relationships developed to influence policy decisions.
- Number of policy and regulatory decision-makers identified and/or contacted.
- Description of types of data provided to decision-makers.
- Number of responses submitted to agency requests for information.
- Number of briefings or town hall meetings attended by policymakers.
- Number of petitions filed.
- Frequency and number of individuals involved in changing environmental public health policy and regulations.
- Description of institutional, policy, or legislative changes.
- Description of changes in community regulations, ordinances, or laws.
- Description of changes in corporate or business practices.
- Description of changes in legislation, policies, and regulation.
- Description of changes in clinical practice guidelines.

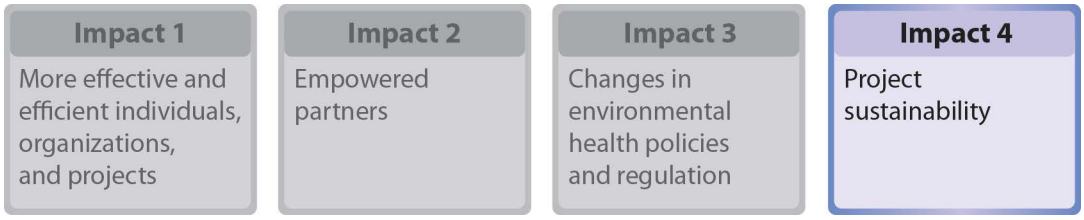
**Metrics in Action 6.9:** Since 2000, **Occidental College's Center for Food and Justice (CFJ)**, has developed two inter-connected models to improve school food. Through Project CAFE (Community Action on Food Environments), the Healthy School Food Coalition (HSFC)—a program affiliated with CFJ—organized students and parents to partner with school officials and health advocates to develop and implement groundbreaking nutrition policies within the Los Angeles Unified School District (LAUSD), such as banning the sale of soda and junk food. Because of HSFC efforts, participation rates for meal programs have risen at school sites, and food in all district schools has improved.

The project leaders also evaluate access factors in participating schools and communities; raise awareness of nutrition, environmental public health, and food access; develop and implement intervention strategies; and assess the environmental and policy impact of those strategies. Activities include training residents to undertake community and school food assessments, developing appropriate and feasible action plans, and creating local community nutrition advisory councils to mobilize efforts to move intervention strategies forward.

**Metrics for changes in environmental health policies and regulation:**

- Descriptions of networks and relationships developed to influence policy decisions: *The CFJ worked with students, parents, school district personnel, and health advocates to influence policy.*
- Descriptions of institutional, policy, or legislative changes: *Policies put in place that ban the sale of soda and junk food in LAUSD.*

## Impact 4: Project sustainability




While financial sustainability is a key component of project sustainability (see Chapter 3 for more on leveraging), project sustainability reflects a project's ability to sustain project services and activities. Project sustainability ensures that valuable information and services continue to be provided to communities. Examples of strategies to ensure project sustainability include:

- **Community Organizations**
  - Sharing environmental public health information with other groups and potential partners.
  - Submission of competitive renewals for projects.
  - Support from local government, universities, or other funding sources.
- **Researchers**
  - Identification of potential future research needs.
  - Submissions of competitive renewals for projects.
  - Submissions of additional secondary grant applications.
  - Replication of partnership and communication models and shared success in new populations.
- **Health Professionals**
  - Attention to additional environmental health concerns of community members.
  - Profession-wide adoption of environmental public health curricula in medical and nursing schools.
- **Decision-Makers**
  - Sustained focus on regulating environmental public health risks.
  - Increased involvement of more decision-makers in PEPH project-related issues.

Not all PEPH capacity-building efforts will result in follow-up projects or continuing activity with the same partners or the same subject. However, sustained activity that stems from a PEPH project can be an indication that the PEPH project has increased the capacity of its partners.

## Metrics for Impact 4: Project sustainability

**Community Organizations**

- Number of PEPH products used or cited in outreach materials developed by the community.
- Number of people not directly involved in the PEPH project that are informed of related PEPH activities.
- List of community organization members serving as principal investigators (PIs) on related grant applications and awards.
- Number of local government and university partners.
- Letters of support from government or university partners.

**Researchers**

- Number and description of meetings to discuss community health concerns.
- Number of communications by community organization members to researchers about environmental public health concerns.
- List of potential future research needs agreed upon by partners.
- Number of grants and grant renewals submitted.
- Amount of outside funding received.
- Additional projects and partners.
- Description of shared partnership and communication models presented at conferences and workshops.

**Health Professionals**

- Number of courses and workshops attended by health professionals about environmental public health concerns.
- Number of annual meetings attended to discuss community environmental public health concerns.

**Decision-Makers**

- Number of ongoing government environmental public health committees.
- Description of sustained involvement of governmental and non-governmental agencies in areas related to the PEPH project.

**Metrics in Action 6.10:** Researchers in Seattle, WA found that many low-income children in Seattle-King County live in indoor environments that place them at substantial risk for ongoing exposure to asthma triggers. To address this problem, the **Seattle Partners for Healthy Communities** created a multidisciplinary partnership of community agencies, community activists, public health professionals, academics, and health providers to design and implement the Seattle-King County Healthy Homes I and II – Asthma Intervention Project. To improve environmental conditions in these homes, during Healthy Homes I the project leaders developed a culturally sensitive community outreach method. The partners recruited community volunteers to provide in-home environmental assessments, asthma education, social support, and asthma-control resources (bedding covers, vacuums, cleaning supplies, etc.), using culturally sensitive outreach and communication strategies. Community workers continue to conduct follow-up visits with the households for one year.

The partnership built on the success of the first project by expanding the program in Healthy Homes II to include an evaluation of the impact of several different asthma intervention methods. It incorporated lessons learned during the first phase, the perspectives of community partners, and evidence from scientific literature. In addition to the in-home intervention, the second project also included a "Community Asthma Nurse" to provide patient education, self-management training, development of a patient-specific asthma action plan, and case management/review. Some community members also received a structural remediation of their house to lessen asthma triggers. Researchers found that children in households that received the Community Asthma Nurse component of the project experienced more symptom-free days, signifying a successful health intervention.

**Metrics for project sustainability:**

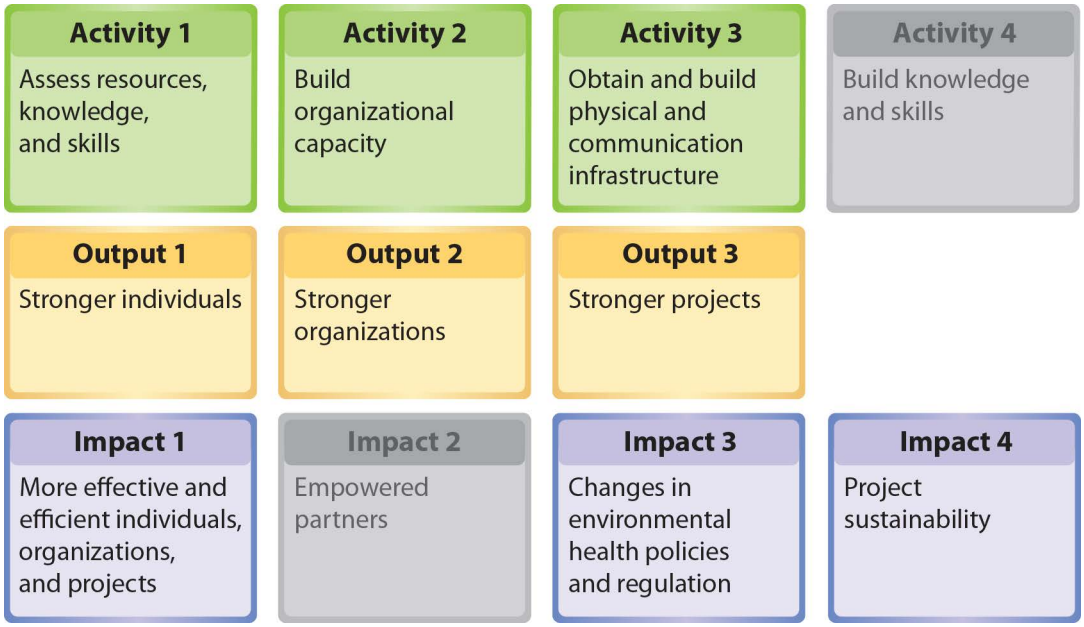
- Lists of potential future research needs agreed upon by partners: *The second phase of the project (Healthy Homes II) addressed the need for an asthma care nurse to help provide patient education, self-management training, development of a patient-specific asthma action plan, and case management/review. It also included an evaluation of different asthma intervention methods.*
- Number of grants and grant renewals submitted: *NIEHS and the Department of Housing and Urban Development provided two additional grants for Healthy Homes II.*

## Chapter 6 Case Study: Swinomish Tribe in Puget Sound

This case study shows the activities, outputs, and impacts for capacity building within the **Swinomish Indian Tribal Community**, a fishing community located adjacent to the Salish Sea (Puget Sound and the coastal waterways around southern Vancouver Island) in Washington State. Screening studies of the sediment and water in Tribal tidelands indicated the presence of numerous persistent pollutants, including arsenic and polychlorinated dibenzofurans (PCDFs).[63]

Swinomish people frequently gather shellfish at these contaminated sites. The Swinomish wished to undertake a more extensive study with more detailed sampling to understand better the magnitude and health implications of the contamination. In 2002, the U.S. EPA funded the Bioaccumulative Toxics in Native American Shellfish (BTNAS) program so the Tribe could study their exposures to low level, bioaccumulative toxics when participating in subsistence gathering and consumption of local shellfish.[64]

**Figure 6.2 A Capacity Building Logic Model Framework for the Bioaccumulative Toxics in Native American Shellfish (BTNAS) Project**




[63] Johnson A. 1999. Investigation of chemical contamination at Whitmarsh Landfill and Padilla Bay Lagoon. Olympia, WA: Washington State Department of Ecology; Johnson A. 2000a. Sediment quality on the west side of inner Fidalgo Bay. Olympia, WA: Washington State Department of Ecology; Johnson A. 2000b. Results of a screening analysis for metals and organic compounds in shellfish from Padilla Bay and vicinity. Olympia, WA: Washington State Department of Ecology; Johnson A, Serdar D, and Davis D. 1997. Survey for petroleum and other chemical contaminants in the sediments in Fidalgo Bay. Olympia, WA: Washington State Department of Ecology.

[64] Swinomish Indian Tribal Community. 2010. Bioaccumulative Toxics in Native American Shellfish Project, 2002-2006.

### Activities

After assessing their resources (Activity 1), the Swinomish Tribe recognized that it possessed the infrastructure capacity required to support an in-depth environmental sampling, analysis, risk management, and education plan with a significant cultural component. Rather than hire outside consultants, the Tribe identified a Tribal employee to serve as the project manager in an effort to build greater organizational capacity (Activity 2). The Swinomish project manager recruited partners to participate on a Technical Advisory Board. The partners included experts from EPA Region X, the Washington State Department of Health, the Washington State Department of Ecology, and scholars at Seattle University and the University of Washington's (UW) Center for Ecogenetics and Environmental Health (CEEH). The Technical Advisory Board worked to build Tribal technical capacities. All aspects of the research were vetted with the technical advisory committee—from choice of sampling regimes to laboratory detection limits and changes in the conventional human health risk assessment metrics—in order to reflect more adequately Tribal practices. The Tribe considered dissemination a key component of the project and set up a comprehensive communication strategy with print, web, television, public forum presentations, and traditional food-related events (Activity 3). This included young Tribal members who honed their video production skills by creating short films and public service announcements, which they later expanded into a full-length feature film (Output 1 and Impact 2).

### Metrics:

- Number and description of resources identified: *The tribe identified one significant resource: infrastructure capacity required to support an in-depth environmental sampling, analysis, risk management, and education plan with a significant cultural component.*
- Number of outside experts hired or brought in to help community conduct PEPH activities: *None; rather than hire outside consultants, the Tribe identified a Tribal employee to serve as the project manager.*

### Outputs

The EPA research grant awarded to the Tribe provided the foundation for a stronger project and the resources needed to move forward (Output 3). The partnerships built via the Technical Advisory Board bolstered the Swinomish project manager's skills (Output 1), as well as the Swinomish Tribal organization as a whole (Output 2), in performing environmental health research. The members conducted a community survey and Seafood Diet Interviews to assess the effectiveness and impact of their communication strategy.

The Tribe also strengthened ties to researchers, decision-makers, and other tribes (Output 2). The Technical Advisory Board urged the project leaders to present their scientific findings, and it provided introductions to the UW Department of Environmental and Occupational Health Services, the Institute for Risk Analysis and Risk Communication, and various government agencies. The Technical Advisory Board weighed in on project descriptions, which led to a mid-project adjustment in the risk analysis technique (Output 3).

Equally important in this case study is that the Swinomish BTNAS project activities and outputs led to increased capacity building for all of the members of the Technical Advisory Board, resulting in better trained individuals available for future research (Output 1). While the Swinomish Tribe improved their capacity to address environmental health concerns, the Technical Advisory Board partners learned how to work more effectively with Native American communities by experiencing firsthand the importance of acknowledging unique cultural beliefs and practices, as well as how these can affect the process and outcomes of any research project. Learning how to work together with Native American communities provided capacity-building benefits to both the Technical Advisory Board individuals and their organizations.

**Metrics:**

- Descriptions of established core competencies: *Participation in the Technical Advisory Board bolstered the project manager's management skills.*
- Description of community advisory board members and their roles and contributions to the project: *The Technical Advisory Board included experts from EPA Region X, the Washington State Department of Health, the Washington State Department of Ecology, and scholars at Seattle University and the University of Washington's Center for Ecogenetics and Environmental Health (CEEH).*

**Impacts**

The project, one of the first of its kind by a Native American tribe, generated interest across the country and allowed Swinomish representatives to connect with other environmental health professionals and discuss research activities, outputs, and impacts (Impact 1). For example, the Tribe partnered with the University of Washington's School of Environmental and Public Health to conduct a workshop about Tribal risk in August 2010. Swinomish BTNAS participants have also represented the Tribe on advisory boards of research projects headed by other tribes and universities.

Results from the BTNAS project have been instrumental in Swinomish policies, such as the Tribe's Water Quality Standards, and they have been cited in arguments for revising Washington State's Water Quality Standards, Sediment Quality Standards, and Model Toxics Control Act (Impact 3).

The Swinomish Tribe also leveraged the funding that they received from the initial EPA grant to sustain their environmental public health work and extend the project's reach into new areas (Impact 4). The Swinomish Tribe, in collaboration with tribal communities across the Salish Sea, continues to conduct research on identifying and addressing environmental public health concerns for their communities.

The achievements of BTNAS project goals are documented in the Final Report and an independent evaluation (Impact 1). By following rigorous scientific protocols for the sampling collection and analysis, while simultaneously adhering to cultural norms by ensuring that beliefs and practices were incorporated into the risk assessment, results showed that consumption of local shellfish posed health risks to the Swinomish people. The Swinomish Tribe also successfully built its capacity to address the problem.

**Metrics:**

- Descriptions of improvements in operations to maximize efficiency: *The Tribe conducted a workshop to examine strategies for reducing Tribal risk as a way to maximize efficiency.*
- Descriptions of institutional, policy, or legislative changes: *The Tribe advocated for changes to the Tribal and State Water Quality Standards, Sediment Quality Standards, and the Model Toxics Control Act.*

# Summary of Capacity Building Metrics

## Example Metrics for Activity 1: Assess resources, knowledge, and skills

- Description of activities conducted to assess needs and resources.
- Number and description of resources identified.
- Number and description of partners involved in assessment activities.
- List of current capacities.
- List of identified capacity needs.
- Description of strategies to address gaps.
- Number and description of project strategy reviews.
- Number and description of revisions to the project plan.

## Example Metrics for Activity 2: Build organizational capacity

### Community Organizations

- Description of bylaws, leadership voting process, and conflict management procedures.
- Number of community organization members involved in evaluation of PEPH project activities.
- Number of outside experts hired or brought in to help community conduct PEPH activities.
- Number of products to disseminate environmental public health information to communities.
- Number of grants applied for with a community member as a principal investigator (PI).

### Researchers

- Number of disciplines and training backgrounds represented by researchers.
- Number of researchers involved in interactions with other partners.
- Number of research partners on a community advisory board (CAB) and description of interests represented by each.
- Number of employees paid by the researcher for participating in the project.
- Number of researchers who have completed Institutional Review Board (IRB) training or have experience in obtaining IRB approval.
- Description of improvements in researchers' grant management, budgeting, or financial skills.

### Health Professionals

- Description of organizational structures and policies that facilitate and enable health professionals to participate in community research.

### Decision-makers

- Number of people interested in environmental public health issues on phone or email lists (either created by decision-makers or provided by community organizations).
- Number of volunteers recruited to take environmental public health messages back to their communities.

## Example Metrics for Activity 3: Obtain and build physical and communication infrastructure

- Description of space and other physical structures obtained.
- Number and description of directories, rosters, or listservs created/obtained.
- Number and description of other resources obtained.
- Number and amount of other funding sources.
- Description of meeting space obtained.
- Number and description of supplies obtained.
- Number of grant applications submitted.
- Number of grants awarded.
- Number and description of non-grant resources and materials obtained.

## Example Metrics for Activity 4: Build knowledge and skills

- Number of classes, workshops, and other training sessions offered or attended.
- Description of new skills obtained.
- Results of pre- and post-test questionnaires measuring changes in knowledge and skills.
- Description of efforts undertaken to share information among PEPH project partners.
- Number of papers published in non-academic outlets – for example, newspapers, newsletters, or online forums.
- Number of forums where community members and health professionals meet to discuss environmental public health concerns (sponsored by PEPH partners).
- Number of decision-makers who attend environmental public health seminars and workshops.
- Number of comments and recommendations by decision-makers on safety or other protocols.
- Number of environmental public health regulatory changes introduced by decision-makers.
- Number of researchers or community organization members invited to policy meetings.

## Example Metrics for Output 1: Stronger individuals

**All Partners**

- Description of established core competencies.
- Results of self-evaluation or other assessments of skills.
- Measures of competency from pre- and post-project testing of abilities.

**Community Organizations**

- Number of other community members mobilized.
- Number of grants applied for and received.
- Number of grants that have a community organization member as a principal investigator (PI).

**Researchers**

- Description of improvement in interpersonal skills.
- Number of relationships with community members, health professionals, decision-makers, and other researchers.
- Description of the effectiveness of translated materials for different audiences.

**Health Professionals**

- Number of patients provided with environmental public health information.
- Assessment of ability to fulfill public health core competencies.

**Decision-Makers**

- Description of participation in PEPH project meetings or forums.
- Number of environmental public health issues presented to the public.



## Example Metrics for Output 2: Stronger organizations

**Community Organizations**

- Description of community organization governance rules and how they are enforced.
- Existence and use of membership lists to communicate with members.
- Number of members in the community organization.
- Descriptions of physical buildings and equipment available to the community organization.
- Description of financial stability/sustainability of organization.

**Researchers**

- Description of community advisory board members and their roles and contributions to the project.
- Number of times the community advisory board weighs in on project decisions.
- Number of projects receiving institutional review board (IRB) approval.
- Description of financial stability/sustainability of research project.

## Example Metrics for Output 2: Stronger organizations *(continued)*

**Health Professionals**

- Number of health professionals partnering with environmental health projects.
- Number of environmental public health courses or workshops required for board certification.
- Number of health professionals specializing in environmental public health.

**Decision-Makers**

- Description of the diversity of decision-makers' staff.
- Description of changes in political support for environmental public health interventions.
- Number of environmental public health consortium agreements with researchers, health professionals, or community organizations.

## Example Metrics for Output 3: Stronger projects

- Description of knowledge, skills, infrastructure, and resources of individual and organizational partners.
- Measures of changes in the knowledge, skills, infrastructure, and resources of individual and organizational partners.
- Description of improved efficiencies.
- Description of the level of coordination of partners.
- Description of a project's ability to respond to contextual factors, such as budget restrictions, administrative rules, etc.
- Measures of project progress toward goals.

## Example Metrics for Impact 1: More effective and efficient individuals, organizations, and projects

- Results from surveys that address changes in knowledge, skills, and satisfaction.
- Description of the quality of partnerships, communications, and project management.
- Description of improvements in operations to maximize efficiency.
- Feedback or survey results showing partner satisfaction with project.
- Description of project productivity.
- PEPH activity completion times.
- Description of cost-effectiveness.
- Description of standards or protocols followed, such as "Good Laboratory Practice."

## Example Metrics for Impact 2: Empowered partners

- Frequency and magnitude of partner involvement in other partners' activities (such as number of community members who are engaged in researcher's activities or number of researchers who are involved in the creation of public policy).
- Number of individuals in partnerships who speak to government leaders about additional health issues.
- Number of individuals in partnerships who run for city council or other leadership positions.
- Number of partners who speak at conferences on projects of mutual interest to other partners.

## Example Metrics for Impact 3: Changes in environmental health policies and regulation

- Description of networks and relationships developed to influence policy decisions.
- Number of policy and regulatory decision-makers identified and/or contacted.
- Description of types of data provided to decision-makers.
- Number of responses submitted to agency requests for information.
- Number of briefings or town hall meetings attended by policymakers.
- Number of petitions filed.
- Frequency and number of individuals involved in changing environmental public health policy and regulations.
- Description of institutional, policy, or legislative changes.
- Description of changes in community regulations, ordinances, or laws.
- Description of changes in corporate or business practices.
- Description of changes in legislation, policies, and regulation.
- Description of changes in clinical practice guidelines.

## Example Metrics for Impact 4: Project sustainability

### Community Organizations

- Number of PEPH products used or cited in outreach materials developed by the community.
- Number of people not directly involved in the PEPH project that are informed of related PEPH activities.
- List of community organization members serving as principal investigators (PIs) on related grant applications and awards.
- Number of local government and university partners.
- Letters of support from government or university partners.

### Researchers

- Number and descriptions of meetings to discuss community health concerns.
- Number of communications by community organization members to researchers about environmental public health concerns.
- Lists of potential future research needs agreed upon by partners.
- Number of grants and grant renewals submitted.
- Amount of outside funding received.
- Additional projects and partners.
- Description of shared partnership and communication models presented at conferences and workshops.

### Health Professionals

- Number of courses and workshops attended by health professionals about environmental public health concerns.
- Number of annual meetings attended to discuss community environmental public health concerns.

### Decision-Makers

- Number of ongoing government environmental public health committees.
- Description of sustained involvement of governmental and non-governmental agencies in areas related to the PEPH project.