ROUTLEDGE FOCUS

ENVIRONMENTAL COMMUNICATION AMONG MINORITY POPULATIONS

Edited by
Bruno Takahashi and
Sonny Rosenthal

ROUTLEDGE Focus

Environmental Communication Among Minority Populations

There are many current socio-environmental conflicts and problems around the world that affect distinct nationalities, races, or ethnicities. Part of the solution to these issues involves interdisciplinary scholarship to make sense of the communication challenges that are involved. However, current research in this area has lacked clear focus on the ways in which environmental issues are culturally and socially constructed by racial and ethnic minorities.

This volume aims to improve our understanding of culturally bounded rationalities across racial and ethnic groups facing environmental challenges, as they relate to the formation of environmental identities, environmental injustice, political activism, public engagement, and media representations, among others. The ideas presented in this book dovetail with the idea that environmental communication scholars and practitioners can effectively intervene to engage ethnic groups that traditionally are not included in decision-making or deliberation processes that directly affect their livelihoods.

Considering problems such as the siting of industrial facilities, flooding, droughts, climate change, and air and water pollution, this book will be of great interest to students, scholars, and practitioners of environmental communication.

Bruno Takahashi is Research Director and Associate Professor at the Knight Center for Environmental Journalism, Michigan State University, USA.

Sonny Rosenthal is Assistant Professor at the Wee Kim Wee School of Communication and Information, Nanyang Technological University, Singapore.

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Contents

1 Models for environmental communication for unique populations

Cases from the field

Maria Knight Lapinski, Kami Silk, Rain Wuyu Liu and Daniel Totzkay

Introduction

Models for large-scale health communication efforts to engage unique populations are common (e.g., CDCP Effective Interventions, 2017); yet these models are seen less often in environmental communication efforts. This chapter reports results and continuing activities of two programs of environmental communication scholarship that involve partnerships with communities to engage in research, outreach, and dissemination activities. Specifically, the Breast Cancer and Environment Research Program (BCERP) and the Financial Incentives in Normative Systems (FINS) research program are discussed. The chapter then compares the two community-based approaches and identifies lessons learned that can inform the design of related environmental communication research efforts. It also highlights future opportunities for research and communication activities as these programs continue. The chapter focuses particularly on the approaches these programs have taken to engage unique communities in the research and design process as well as the ways in which the programs have translated research findings into practice.

In using the term *unique*, it is meant that these communities function at the margins of society (co-cultural groups, Orbe, 1998) or are different from a dominant cultural group. These groups or communities can be characterized based on shared linguistic features, psychological states, values, and belief systems that separate them from some dominant group within a nation state or geographical boundary. By considering groups based on shared cultural characteristics and identities, we intentionally avoid using the term minority because it is a label that implies a numerical category. The two programs presented here focus on populations with distinct needs, patterns of cognition, and preferences for communication that are crucial to consider for effective intervention design. One case involves moving

community insights and social research into the design and dissemination of environmental communication efforts; the other involves using community-engaged research to inform the design and dissemination of environmental policies. First, it is useful to describe the nature of transdisciplinary, community-engaged communication research for unique populations.

Transdisciplinary, community-engaged research and design

A common thread of the BCERP and FINS are that both programs involve community-engaged design of the research and intervention activities. Community-engaged design, although a relatively new label for communication research and practice (Neuhauser, Kreps, & Syme, 2014), is an old concept. Engaging communities in communication research and intervention design is described in foundational approaches to communication study. As far back as *The Rhetoric*, Aristotle wrote extensively on the need for a speaker to understand the values and characteristics of audiences in order to be a persuasive and engaging speaker, identifying the importance of interactivity and engagement. Basic communication campaign design courses focus on stages at which a campaign"s focal community is brought into the design process. For example, Rice and Atkin's (2012) foundational text describes the ways in which effective communication campaigns involve audiences (or communities) in the design, creation, and refinement of communication efforts through the use of needs assessment, formative evaluation, assessment of the communication environment, and other processes for bringing community voices to the table. Such activities suggest the role of community members ranges from little or no community engagement with professionally designed messages and campaign materials to extensive engagement, wherein the community sets research priorities and inputs directly on intervention design.

Cases where there is limited engagement may include models where a communication campaign, program of research, or intervention is designed and implemented by a team of experts, independent of input from community members. This is a common approach when experts believe they have a strong understanding of their target audience(s) and have a specific, evidence-based message they deem as clear and necessary to communicate (e.g., Smokey the Bear; The Ad Council, 2017). At the other end of the engagement continuum sits community-based participatory research (CBPR) approaches where community members may drive decisions about the focal issues, populations, and problems for interventions or the hypotheses and research questions under study (c.f., Oetzel, Simpson, Berryman, Iti, & Reddy, 2015). For example, the HIV/AIDS Prevention Community Planning in the United States where members of the HIV positive

community and unique populations disproportionately impacted by HIV/AIDS (e.g., men who have sex with men; commercial sex workers) identified priority research areas, set intervention priorities, and helped to craft and disseminate communication interventions (c.f., Lapinski, Randall, Peterson, Peterson, & Klein, 2009). Finally, there are many programs and projects in the middle of the continuum, in which community members are engaged at a variety of levels including as key informants, providing data on community needs, leading the design of communication materials, or actually implementing the intervention itself.

Community-engaged communication design and research, by definition, accounts for the characteristics of unique population groups. Again, the term "unique populations" is used in this case to include groups that function at the margins of society (co-cultural groups; Orbe, 1998) or that can be juxtaposed with a dominant cultural group. Co-cultural groups share a set of meanings relative to those held by a larger system (Orbe, 1998); that is, social communities exhibiting shared, learned communication characteristics, perceptions, values, beliefs, and practices. When examining communication patterns and practices, identifying groups based on shared meanings and psycho-social characteristics is more useful and insightful than classifying people based on simple demographics like race or ethnicity. Indeed, identification of these shared meanings, values, behaviors, and attitudes is fundamental to community-engaged design and research. Thus, more effective programming around a problem can arise from applying this inclusive approach to intervention design and team planning.

When addressing multifaceted societal issues, the use of a transdisciplinary model is necessary. Transdisciplinary team science is founded on the assumption that some problems are so large and complex that in order to address them, multiple disciplines need to come together. Transdisciplinary research involves diverse teams designing innovations through research and outreach efforts that transcend traditional disciplinary approaches to a problem. These innovations may be conceptual, theoretical, methodological, or translational mechanisms created by the team to address a common challenge (Harvard School of Public Health, 2012). The transdisciplinary research model focuses on translating research findings into practice; this ensures the state of the science is communicated beyond academic journals so that interventions and communication efforts are informed by the most recent scientific findings (Silk & Smith, 2016; Stokols, 2006). Transdisciplinary teams are organized to be inclusive of not only researchers from different disciplines, but also members of relevant communities, including people focused on a specific environmental issue. Transdisciplinary teams are comprised of team members from academic institutions and community organizations to create partnerships and networks consisting of the

necessary areas of expertise to accomplish research or intervention goals. Transdisciplinary research is distinct from more familiar orientations like interdisciplinary and multidisciplinary research (Mitchell, 2005). Interdisciplinary research involves not just combining or juxtaposing concepts and methods from different fields but integrating divergent perspectives to create something new. Multidisciplinary research, on the other hand, emphasizes working sequentially or independently and then coming together at the late stages of research. Transdisciplinary research models, however, integrate perspectives across disciplines in order to create new approaches, paradigms, and methods to address a research problem that would not have been realized by independent and separated research initiatives undertaken in distinct disciplines (Kreps & Maibach, 2008) akin to *third culture building* in the intercultural communication literature.

Research on the "science of team science" holds lessons for the ways in which effective teams function (e.g., Falk-Krzesinski et al., 2011; O'Rourke & Crowley, 2013). Below we present two cases of community-engaged, transdisciplinary environmental communication efforts. For each program, we describe the program activities and outcomes, the nature of the team including mechanisms for community engagement, and the ways in which the program findings and processes are moved into practice. These programs address two very different issues; the first case is focused on communication about environmental risks for breast cancer, while the second case examines the role of communication in environmentally focused economic policies.

Case 1: breast cancer and the environment research center

The first program that includes a unique population in the development and implementation of communication interventions is the BCERP, funded initially by the National Institutes of Environmental Health Sciences (NIEHS) and the National Cancer Institute (NCI) beginning in 2003, and with current funding awarded through 2020. The BCERP partners communication scientists with biologists, epidemiologists, and community advocates to investigate the role of environmental risk factors in breast cancer. The BCERP is particularly interested in different "windows of susceptibility" such as puberty and pregnancy because females are more vulnerable to environmental exposures during these time periods, which can increase breast cancer risk. Another primary goal of the BCERP is to support risk reduction efforts through community engagement and strategic communication endeavors. The BCERP is organized around three cores: 1) Biology; 2) Epidemiology; and 3) Communication, Outreach, and Dissemination (COD). Each of these cores collaborates with the others on specific projects and

through working group structures designed to facilitate transdisciplinary research. Each of these cores is represented by a number of institutions and community partners across the United States, all of which are tied to a central coordinating center (see Figure 1.1) in Madison, WI. These institutions are those primarily funded through the overarching BCERP mechanisms, with other institutions, researchers, and community partners connected to these larger institutions. These funded institutions include Michigan State University (MSU) (East Lansing, MI), Silent Spring Institute (Newton, MA), the University of Massachusetts, Amherst (Amherst, MA), Columbia University (New York, NY), the City of Hope National Medical Center (Duarte, CA), and Georgetown University (Washington, DC). Each funded institution is required to have a COD core, which makes community partnerships an essential feature of the organizational structure and function of the research projects.

A primary goal of the BCERP is for researchers across disciplines to communicate regularly with each other so that new evidence is more quickly shared among them and then translated for lay public consumption. Specifically, the BCERP is concerned with the perceptions and preferences of women, especially mothers with young daughters. This unique population has distinct concerns, especially for their children, and reacts to breast cancer risk reduction information differently based on maternal appeals of responsibility (e.g., Neuberger, Silk, Yun, Bowman, & Anderson, 2011). A chief concern of the BCERP is to include the opinions and views of breast cancer community advocates in the overall functioning and decision-making of the organization, in addition to the research agendas of the scientists within the group. Engaging community advocates as a unique population

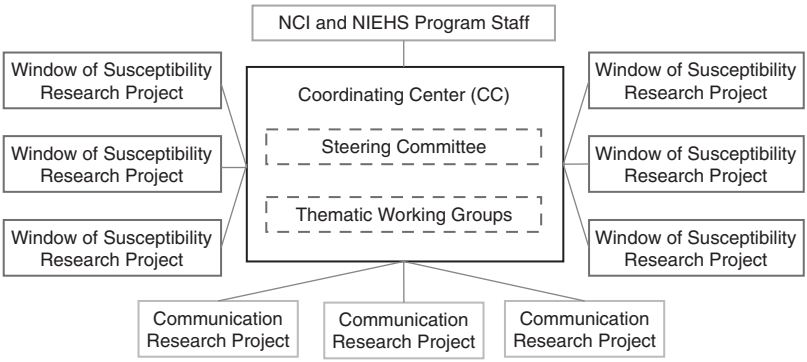

Figure 1.1 Organizational chart of the Breast Cancer and the Environment Research Program

in and of itself, the BCERP aims to give voice to a population that might otherwise be unheard in the research context.

BCERP researchers have examined specific chemicals found in the environment – like bisphenol-A (BPA) and perfluorooctanoic acid (PFOA), among others – and their role as endocrine disruptors that might increase risk of breast cancer later in life. The consequences of different diets, such as those high in animal fats, have also been examined by BCERP biologists using animal models. Additionally, BCERP epidemiologists have followed cohorts of young adolescent girls with regular tracking of urine and blood samples to determine exposure levels and pubertal development. One particular focus of this research is the role of these exposures during puberty, which is a window of susceptibility, or a period of development when mammary glands are undergoing growth or change and are thus more prone to disruption from risk exposures. The triangulation of both human and animal data about environmental exposures, collected by the biology and epidemiology cores, is a key goal of the research program to better understand mechanisms of breast cancer. The COD core, comprised of environmental and breast cancer advocates as well as researchers, also plays an integral role in the BCERP.

BCERP advocates were initially responsible for lobbying of Congress to obtain funding for breast cancer and environment research; they were the catalyst for an initial $35 million dedicated to the first round of seven-year funding for different centers across the United States. From the BCERP's inception, the COD has helped to ensure high retention rates in the epidemiology studies, created and populated websites with BCERP-related educational materials, engaged communities via town hall meetings and educational materials, served on BCERP working groups, engaged in communication research with BCERP partners, and, overall, have maintained an important community/stakeholder presence who provide insights for BCERP scientists. The COD has also initiated communication research activities to better understand their respective and collective audiences so they can develop and tailor appropriate BCERP communication materials about environmental exposures and breast cancer risk reduction recommendations. At the time of this writing, the COD has trained advocates on semi-structured focus group interview techniques to recruit members of their communities to discuss and better understand perceptions of environmental risks of breast cancer as they pertain to the research of the respective biology and epidemiology core members (Silk et al., 2017). This allows for even more fine-grained targeting of the beliefs and values of the unique populations embedded in the advocates' communities who are concerned with the health and well-being of their daughters and of the public at large.

Case 2: financial incentives in normative systems

The second community-engaged, transdisciplinary case, FINS, is a six-year program of research using combined emic-etic studies (i.e., studying phenomena from both within and outside of a group, respectively) of a unique population group designed to identify key lessons from research for the design and implementation of payment for ecosystem-services policies (PES) programs. Most recently funded by the US National Science Foundation's (NSF) Interdisciplinary Behavioral and Social Sciences mechanism (IBSS), this program of work began with a series of internal seed grants to a small team of scientists and support through the United States Department of Agriculture's Hatch Mechanism. PES programs are economic interventions designed to offset the financial costs of conservation behaviors by paying people to conserve, protect, or enhance natural resources. The FINS program currently includes a team of people from a conservation organization, including community researchers (ethnically Tibetan interviewers, surveyors, and experimenters), two universities, and four disciplines (see Figure 1.2). Its ultimate goal is to move a program of research and theory-building on social norms and financial incentives into policy recommendations for the ways in which PES policies are implemented.

Framed in theories of social norms and culture, this FINS research (c.f. Lapinski, Kerr, Zhao, & Shupp, 2017) is being conducted in the Sanjiangyuan area, located in southern Qinghai Province on the Tibetan Plateau (see Figure 1.3), home to about 960,000 inhabitants of whom 90% are ethnically Tibetan and about 70% are pastoralists. The area is ecologically significant because its glaciers and high-altitude grasslands provide significant inputs to three of Asia's major rivers (the Yellow, Yangtze, and Mekong) that provide fresh water downstream to nearly a quarter of the world's population. The grasslands of the Plateau have supported Tibetan nomadic populations for thousands of years and nurtured a unique culture of which a fundamental element is Tibetan Buddhism. Economically dependent mainly on yaks and seasonally available caterpillar fungus, Tibetan society and culture have developed strong self-disciplinary norms about ecological conservation. As such, the Tibetan pastoralists represent a unique population group in that they can be juxtaposed with the dominant ethnically Han culture, and there is evidence for a shared set of values, beliefs, and practices of this group (see work by Yeh, 2012; Yeh & Gaerrang, 2011). Community perspectives have been and continue to be infused throughout the FINS program. For example, decisions about research foci (e.g., herding practices, patrolling for poaching of wild-animals, and to a lesser extent human-bear interactions) were driven by community needs and existing practices and values; design and implementation of the study protocols and instruments

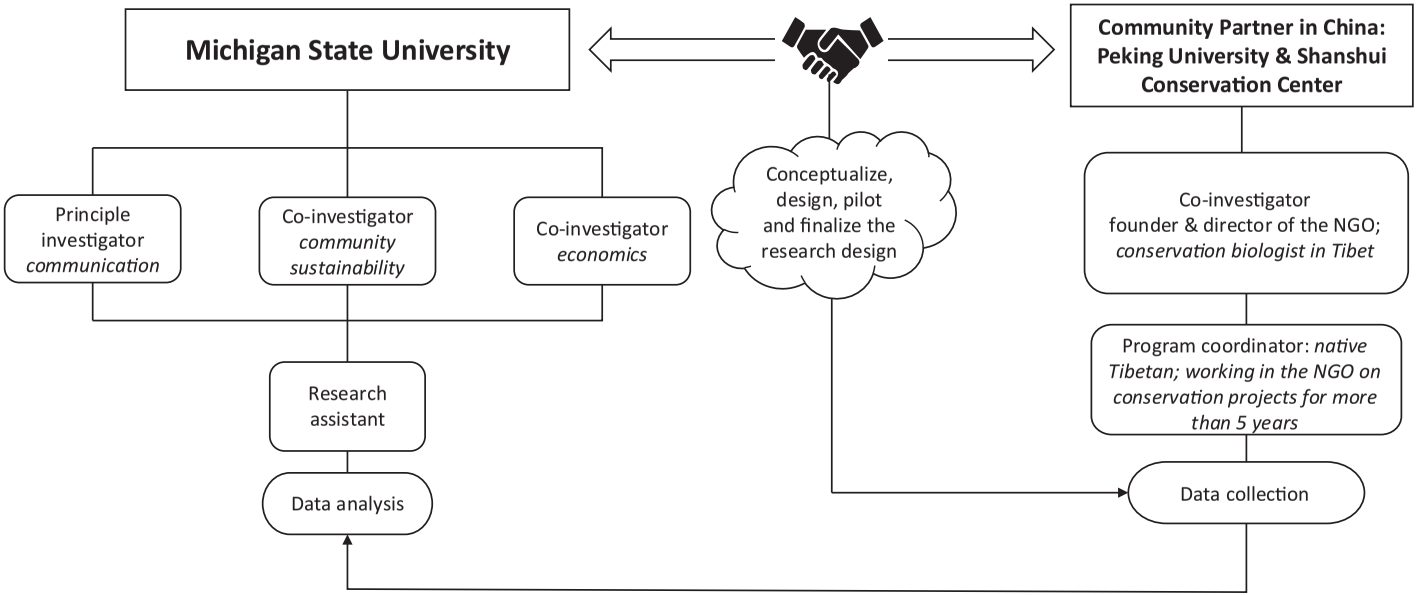

Figure 1.2 An illustration of the collaboration between the US-based research team at Michigan State University and the community partner in China in the FINS project

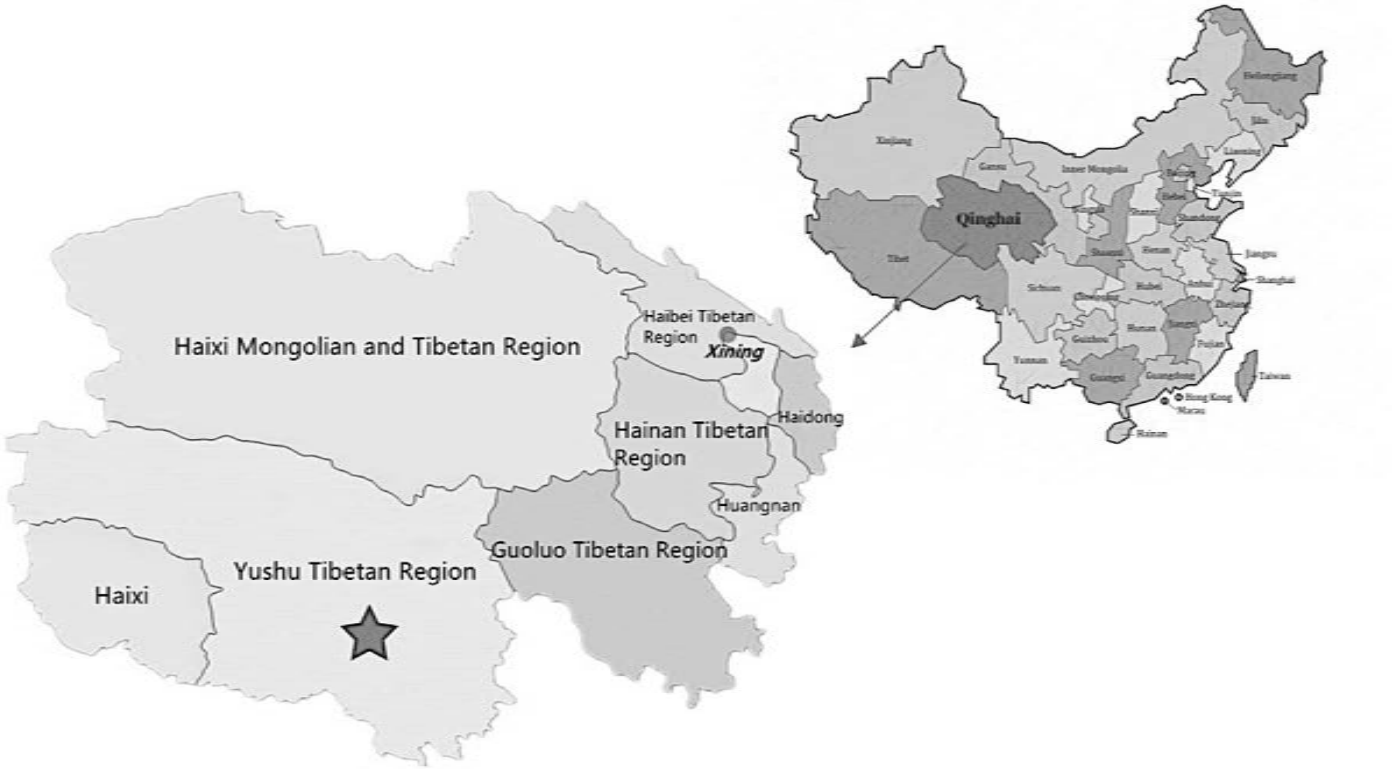

Figure 1.3 Study site in China for the FINS project

Source: Creative Commons – Open Source

were informed through community member input; and, data from the community informed the design of the measures, theoretical model, analysis procedures, and focus of program efforts. Currently, the team is working to design policy recommendations and developing best practices.

Shanshui Conservation Organization, a conservation non-governmental organization (NGO) and collaborator in this program, operates a community-based conservation program using non-cash incentives while also drawing on local norms in favor of conservation. This NGO is engaged with local government officials responsible for conservation and has brokered agreements in which the government has given local people greater responsibility for conservation, including PES programs that pay people to modify their herding practices to protect grassland quality and quantity. The Sanjiangyuan region is a key site for this kind of research because of the existing social structures documented in prior research (e.g., Yeh, 2012), the types of behaviors important for conservation, the research available on the complex cultural dynamics of the region, and the potential to provide input on forthcoming large-scale PES work in the region.

Most PES projects are government- or donor-funded, with budgets subject to political processes and availability of funds. This makes them susceptible to elimination, raising the question of what will happen to the targeted ecosystem-related behaviors after a program ends. The economic models that drive the design of PES programs are ill-equipped to address this question. However, communication science explains the effects of social norms and other psycho-social factors on behaviors, though it has not incorporated the effects of monetary payments (c.f., Lapinski et al., 2017). Substantively, the FINS program looks at the effects of short-term monetary incentives on normative systems and on longer-term behavior. It integrates economic models and models of social norms to explain and predict the ways in which monetary incentives influence social norms and behaviors.

The project outcomes and activities focus on several issues. From a substantive standpoint, the outcomes of the project are two-fold: (1) to design and test culturally derived measures of social norms and the factors associated with normative influence and (2) to design and test a model of PES programs that accounts for the effects of social norms and conservation-related values in economic systems. These outcomes were accomplished through a series of activities, including meetings with cultural insiders, deep discussions among team members about the conceptual foundations of the project ideas, in-depth interviews with community members, a survey of households, and some small field experiments. From an implementation, broader impacts, or translational perspective, the major objective of the FINS program was to determine the meaning of the study findings for the ways in which PES policies and programs are implemented, identify best

practices, and disseminate this information to groups that might use it. This activity was accomplished by creating summative documents of all study findings, holding a series of team meetings and discussions with program staff charged with program implementation, and drafting recommendations for practice. These documents were designed to be shared with local conservation organizations and possibly governmental officials in the study region, as well as to NGOs working in China and on PES globally (e.g., Conservation International). This last activity was in-process at the time of this writing. The research and outreach work of the team will ultimately contribute recommendations for implementation of PES programs that avoid crowding out non-monetary motivations for conservation behavior.

Key areas of similarity and difference

In an effort to distill key lessons learned from the BCERP and PES, a number of criteria have been identified to consider for comparison. These criteria represent both macro and micro considerations as individuals move forward with partnerships for environmental communication research. Table 1.1 provides a snapshot of the criteria and a side-by-side comparison with lessons learned. The following section elaborates on a range of criteria to consider as large-scale environmental communication projects are designed and implemented.

Scope and partners

Identification of project scope and the organizations and individuals to be involved represents a key decision as a program or project moves forward. Limiting the scope of a project and clarifying the role of partners in meeting the scope of work needs to be delineated early in the design of project, but there also needs to be some flexibility as projects evolve. The defined scope of the BCERP is to examine environmental factors and their relationship to breast cancer risk, with a focus on windows of susceptibility. The particular scope of these factors includes, as mentioned previously, chemical exposures in common commercial items like BPA, PFOA, and oxybenzone. However, diet has also been included as a factor in one's environment, such that diets high in animal fats have been found to be associated with breast cancer in later life, especially when those diets are had during a window of susceptibility like puberty. Partners have been domestic, but representative of a wide geographic area from the West Coast, Midwest, Northeast, and Southeast parts of the United States. Primary partners have been biologists, epidemiologists, communication scientists, and advocates from both environmental and breast cancer groups. Within the transdisciplinary

Table 1.1 Comparison of environmental communication programs

Criteria	*BCERP*	*FINS*	*Lesson learned*
Scope	Broad	Narrow	Identifying and maintaining a scope that is reasonable given the partners and resources available.
Partners	Domestic	International	Regardless of geography, a clear understanding of partnership parameters and roles is necessary.
Level of community participation	High	Moderate	For community partnerships to work, community groups need to be full partners at all levels of the research/project.
Complexity of structure	High	Low	Partnering with different stakeholders is complex due to varying cultures, goals, and priorities that need to be valued.
Relationship building/trust	High	High	This takes time and requires long-term commitment beyond grant cycles.
Capacity building	Moderate	Moderate	Ultimately, models need to support the long-term needs of community partners and help build capacity.
Decision-making	Shared	Shared	Partnerships require shared decision-making about project. Setting up processes is essential.
Transdisciplinarity	High	High	These are problems that are bigger than one discipline and require different stakeholders around the table.
Time	Extensive	Extensive	Time to complete work is elongated due to the need to honor stakeholder input and relationships.
Community partner budget	Inadequate	Extensive	Community partners need to be budgeted into projects fairly to support their time and efforts; they are not simply volunteers.
Audiences	Parents, young girls, advocates, pediatric HCPs	Tibetan pastoralists, policy-makers	Priority audiences must be identified. Extending beyond them to increase reach of environmental communication to other groups is a long-term endeavor.
Organization	Coordinating center model, working groups, steering committee	Team model, independent working groups	Organizational structures can be specified in advance of project implementation and modified throughout the course of the program as necessary.

model, there is an expectation that opportunities to partner in novel ways will evolve as the partners collaborate, which allows for innovative science that may span the boundaries of the original scope of work.

The FINS program started as a collaboration among academics from various disciplines and then expanded to the current project team with the inclusion of a community partner (i.e., Shanshui Conservation Center; see Figure 1.2). It has had a fixed set of partners for the life of the current funding cycle, but is expanding as the team begins to look more closely at the ecological changes connected to social changes. Although the overarching focus of the project (i.e., the long-term effects of short-term financial incentives on social norms) has changed very little and the team's focus on PES programs and policies remains constant, the context and details of the scope of work continue to evolve with new findings. That is, as our data and discussions with project partners indicate particular areas of inquiry and application are more or less fruitful and relevant, the project activities have shifted accordingly. Importantly, for both programs, the deliverables promised to funders have allowed for this to occur, but this kind of flexibility is something not all funding mechanisms/funders will abide.

Level of community participation

When it is appropriate to forge partnerships between researchers and community groups, identifying the nature of that collaboration and the level at which it is useful for all collaborators is key. The BCERP attempts to involve community partners across all areas of the project. Working groups, requests for proposals for opportunity funds, publication guidelines, representation on the program's steering committee, and all other facets of the project strive to ensure that the voices of community partners are heard and provide insight at all levels of the project. This approach creates an equitable structure where community partners' input is not only heard, but valued.

In the case of the FINS project, early iterations began by talking with community organizations globally (in particular, Conservation International) about the relevance of some of the team's ideas for the work they do, as well as places they saw gaps in their understanding of people's response to their PES activities. This involved in-depth discussions with Conservation International field and program staff as well as a field visit to a PES reforestation project. For the portion of our work that is funded by the NSF, Shanshui Conservation Organization served as an equal partner in the project design and implementation, including having a named co-investigator on the award. The project deliverables and budget included specific activities to bring community voices to the table and ultimately to take the program findings to policy-makers and other stakeholders.

Complexity of structure

When addressing large, real-world problems with community-engaged approaches, complexity in structure and implementation is certain. The BCERP is a large group of stakeholders with an expansive goal to investigate the role of environmental factors in breast cancer. There are many regions, scientists from different disciplines, community partners, a coordinating center with many resources to assist the program's implementation, a steering committee, government agency representatives, multiple core groups (EPI, BIO, and COD), working groups, and each individual site has its own structure with associated meetings (e.g., the MSU team has three separate monthly meetings for respective groups). There are also individual committees that evolve for planning the annual integration and annual meeting for the BCERP.

For any given member of the BCERP, it is a substantial time commitment to participate in meetings, particularly for those with greater involvement. Within this structure are competing goals of different stakeholders that need to be understood and valued. For example, while all stakeholders have buy-in and support the overarching aim of investigating environmental risk factors, they each have other goals to keep their community advocacy groups satisfied, informed, and funded so they are meeting their individual advocacy missions. Valuing these different primary and secondary goals for participating in the BCERP will facilitate meeting goals and partner needs.

The FINS is a smaller project with a simple partnership model between a group of researchers from different disciplines and a non-governmental, community-based, environmental organization. The most complex aspects of the structure involve the research implementation model which has involved a network of translators, data collection staff, field supervisors, and researchers to allow for data collection to occur. Team members from the conservation organization coordinate the connections with local policymakers and government officials which helped guide the project development to a small extent and will be crucial as the project findings are disseminated.

Relationship building and trust

All strong partnerships develop from a position of mutual trust, but this does indeed take time to develop. Understanding the need for partnerships to develop, the BCERP, originally the Breast Cancer and the Environment Research Center (BCERC), was funded for seven years in its first round. Such a period of funding is uncommon, but the pioneering nature of the project necessitated a longer commitment early in the project to help

facilitate the partnerships and science that would evolve from those partnerships. Trust cannot be manufactured, and trust takes time when there are a range of specific aims and objectives to be met for the project, competing goals across different stakeholders, and the integration of different project components in an often highly emotionally charged advocate environment.

As for the FINS, the initial project team formed organically and took advantage of a small amount of internal university funds to seed the project. The NSF project funds, which span four years, was a result of two years of working together, field work, and building relationships with potential partners and community groups. Trust among project partners has been built largely through consistent contact among team members: the local team meets weekly and the larger team meets regularly using virtual meetings, in additional to in-person meetings that happen in the field at least annually. This is something that has been negotiated through the life of the project. There were several times where team members in China expressed their dissatisfaction with their connection to project activities and as a result, the project team implemented changes to procedures to provide greater opportunities to connect. Busy schedules, working across time zones, and language differences add complexity to the project.

Homophily of team members helped to build trust initially. For example, the lead from the conservation organization is a conservation biology researcher and the organization has a research-driven model of decision-making. Because of this, the team shared perspectives on the value of both social and natural science research. A second factor that has impacted trust is the completion of project deliverables by team members. The project activities have progressed consistently through the life of the project largely by using regular team meetings and retreats as a mechanism for team members holding themselves and each other accountable to the project.

Capacity building

Capacity building is not always salient for project stakeholders, but is critical for the longevity of projects. Capacity building is the idea that program efforts should help to inform how the community can do what they do with greater ease, efficiency, reach, or effectiveness. Perhaps this is through new processes, people, or resources – regardless, the capacity building ideas need to evolve from a partnered perspective. In the case of the BCERP, program activities can provide advocates and community partners with resources, networks, and funds to meet their individual missions that align with BCERP goals. The use of funds and resources, ultimately in service of the BCERP, provides additional benefit to the individual partner organizations' sustainability.

In the case of FINS, a stated goal of the project team was building the capacity of the staff of the conservation organization in terms of social science methods, data collection, analysis, and reporting. These needs and the ability of the project to meet these needs continue to evolve as the project moves forward. The second aspect of capacity building is using data from the project to inform the community implementation of PES. This is just the beginning as the team synthesizes and integrates the project findings.

Decision-making processes

In collaborative projects, there need to be clear processes for how decisions will be made. In other words, there should be a clear document for what decision-making modality will be invoked when large project decisions are to be made. For example, will a working group make the decision in the BCERP, an individual principal investigator (PI), or the BCERP Coordinating Center? Will the decision be an individual mandate (PI), consensus decision (100% agreement), majority rules (a vote where a quorum is necessary and 51% vote carries), or a small powerful minority (steering committee decision)? Further, in what circumstances will it be necessary to invoke decision-making processes? These processes are typically ignored in research collaborations and thus there is a lack of clarity that leads to groups feeling disenfranchised and "not heard" as equal partners in the project. In part because of the small scope of the FINS, no decision-making model was specified for the team, and decisions have been made largely by consensus or fiat depending on an issue's urgency.

Transdisciplinarity

Environmental challenges will not be solved by one discipline, as they are multifaceted and complicated; thus, the use of transdisciplinary models is necessary. For the BCERP and the FINS program, a transdisciplinary scope has been essential. For the BCERP, a question that has been posed is whether or not it would have accomplished more or less if it did not have a transdisciplinary focus. There is not a straightforward answer to this question, but there is clear evidence that the ongoing interaction between the disciplines has led to novel questions and an increased ability to more nimbly move in those novel directions. For example, the triangulation of data from animal and human studies has had heuristic value that may have taken much longer had scientists not partnered with the BCERP. And because the BCERP adopts the precautionary principle, in which precautionary measures are taken against some potentially (albeit not entirely verified) risk to human and/or environmental health, advocates have more quickly shared

risk reduction messages with lay audiences than perhaps they would have by using a different research model.

The transdisciplinary scope of the FINS program was fundamental to all aspects of the team's work. That is to say, the tasks could not be accomplished without the transdisciplinary team. The genesis of the work is an integration of theories from communication and economics; therefore, the methods and approaches cut across these disciplines. The community organizations involved in the project impacted the design of the theoretical models and the context for application of both the ideas and outcomes of the project. Although the complexity of working across disciplines can sometimes reduce the efficiency of task accomplishment, in the case of FINS, it would not exist without each of the program partners.

Application of theory

A challenge for community-based partnerships and transdisciplinary collaborations is to maintain a rigorous application of communication and behavior change theory throughout all aspects of programming. The BCERP is unified around the central theme of understanding the environmental link to breast cancer and disseminating those findings for risk reduction activities. Across the collaboration, there are diverse ways of knowing and methods of inquiry that are employed. On one hand, this is an advantage as it challenges partners to be clear on exactly what their research and activities mean in the greater scope of the project. In addition, it allows for unique understandings of the problem of breast cancer. On the other hand, it can be difficult at times to fully communicate, say, the benefit of one theoretical framework over another or the usefulness of a particular social scientific method to biology and epidemiology partners. This lack of theoretical and methodological unity can impede intra-organization understanding, but can also push partners in all cores to be realistic about how substantive their work is and inspire more innovative strategies. It also allows for more flexibility in planning program activities, as theories and methods can be seen as elements in a toolbox, in which one may be best suited to address a particular part of a problem.

As for the FINS, theoretical concepts were integrated from communication sciences and economics into a single economic model to explain the long-term impacts of short-term incentives on social norms and behavior. Whereas a typical economic model characterizes the effects of conservation payments as promoting conservation behavior and thus improving ecosystem conditions, according to this integrated model, the conservation payments and the resulting actions both influence social norms and in turn are influenced by social norms. Feedback from changes in ecosystem

conditions also influences actions. Throughout the course of the entire project, each stage of the research has been carefully designed and implemented to stick to this overarching framework. In addition to regular in-person and virtual meetings between the team at MSU and Shanshui, throughout the life of the project, team members traveled between the two organizations on a regular basis for long working sessions. For example, a week-long intensive workshop was held in July 2016. Two researchers from the MSU team traveled to Xining, China, where Shanshui's main office is located, and convened collaborators to discuss the scope, theory-building, and progress of the project.

Time

Community-based partnerships take time not only to develop but also to implement. The more individuals who join a team, the more time it will take to understand their concerns, gather their input, and engage with them as substantive team members. In the BCERP, every COD-related project has taken longer than projected. Although this is true most of the time in research, it is particularly true with community-based models. There are basic challenges of how to get everyone on regular conference calls, resolve research ethics issues (e.g. IRB requirements) that accompany multi-site projects, and understand that many community partners are volunteers and even breast cancer survivors managing serious health issues. Similar challenges have faced the FINS team: time-zone barriers; long trips to study sites; and moving across English, Mandarin, and Tibetan have increased the time required to complete project activities despite full commitment and engagement on the part of all project team members.

Audiences/population

Translational efforts for the BCERP have focused on a number of audiences, particularly mothers of young girls who can influence their daughters' behavior during a window of susceptibility to environmental cancer risk factors. Translating emerging science into usable messages for lay audiences requires cooperation from scientists, as they are not always ready to share risk reduction messages from their research, and certainly not before their findings are published.

A central feature of the FINS program is the characteristics of the unique population on which it is focused. The grassland ecosystem on the Plateau has supported Tibetan pastoralists, who have historically been nomadic, for thousands of years, and nurtured a unique culture of which Tibetan Buddhism is a key element; including a strong norm for individual behaviors

that encourage people to live in harmony with, and respect, the land, water and all living beings (Shen & Tan, 2012). Tibetans living in the Shanshui region have made significant contributions to conservation and are, perhaps, the primary reason why large numbers of wildlife still roam freely on the Plateau. Translation of findings in this project is designed to happen at two levels: (1) for partner staff and leadership, which include members of the ethnic Tibetan population and (2) for policy-makers and conservation leaders who implement PES policies. The first has occurred throughout the life of the project and corresponds to capacity building. The second is just beginning as a final phase in the funded activities, which will be led by the conservation team members.

Community partner role and budget

The idea of community partners needing a budget to do their required work for the grant project is counterintuitive for some scientists. One perspective is that community partners are volunteers and they are doing the work as part of their volunteer endeavors – so, why would time be budgeted for those efforts? Ultimately, this perspective is problematic as some granting agencies are now requiring a high level of partnership for translational purposes. Similarly, in the case of federal or state funders, citizens whose taxes may pay for research have an inherent right to be informed in a useable way about the emerging science their taxes are paying for. This may seem simplistic, but it takes expertise, networks, and time. Community partners can provide this expertise, networks, and time, but it is at a cost to them and they should receive appropriate compensation for their efforts. For the FINS project, the community partnering organization was part of the design of all project activities including the budget; capacity for budget management was high at all institutions although administration varied.

Some BCERP sites have funded their community partners very well and some have provided less of a budget for activities. This is an area where community partners may need training so they can negotiate appropriately at the start of a grant submission for the necessary resources required for the work requested. It is also a case where capacity building can occur for all project partners at all levels of a program of work. For example, MSU has a community outreach and engagement certificate program designed to train current and future researchers on aspects of community-based projects. Like universities and research institutions, community organizations vary in their ability to manage budgets. Again, this area is ripe for capacity building activities and coordination early in project activities.

Concluding thoughts

This chapter provided an overview and analysis of two very different programs of environmental communication research and engagement with unique populations. Our purpose here was to identify key dimensions of the programs, critically and reflectively examine them, and ultimately describe the promise and pitfalls of these programs in order to facilitate other efforts in this space. These two programs, which span over 20 years total, provide different models for stakeholder engagement, interdisciplinary collaboration, and moving environmental communication research into practice. They use different models for understanding and connecting with domestic and international unique population groups. This chapter has addressed the challenges of complex projects, including incorporation of diverse viewpoints, reconciling conflicting goals, and building capacity to work together. If health communication offers an example, environmental communication scholars should continue their efforts to work closely with groups and people who put research into practice. The community-driven, participatory models of environmental communication facilitate valuable connections among groups who need each other to solve, or at least address, complex problems. Not to be overly dramatic, but the future of the planet may depend on it.

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