Enhancing Community Participation in Intervention Research: Farmworkers and Agricultural Chemicals in North Carolina

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The participation of affected communities in the development of public health intervention research improves project sustainability and effectiveness by making projects more relevant and acceptable to the communities. This article presents a multimode, multidomain model approach for community participation in different project components, which ensures the benefits of participation without requiring the same level of participation in every activity or by every community sector. A case study is used to illustrate the model, describing procedures for establishing and maintaining farmworker participation in developing an intervention to reduce exposure to chemicals. Farmworkers are a poor and underserved population for which the empowering and culturally appropriate benefits of community participation are especially needed. However, this population presents challenges for participatory health projects: geographic dispersion, ethnic diversity, lack of organization, sense of powerlessness, and communication and transportation difficulties. The lessons learned in this case extend the method and theory of community participation.

In this article, we present a model for enhancing community participation in the process of designing a public health intervention and illustrate it with a case study. This model is applicable to a wide range of communities, particularly those that are geographically dispersed and lack strong political and social organization. Community participation is promoted as an important component in the design of community health projects, improving content and process in several ways. Participation of community members in intervention development increases the likelihood that the intervention will be culturally appropriate; its format and content will better fit the cultural systems of the community. Community participation produces a more sustainable intervention that continues to be

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used by community members when outside health professionals turn their attention to other issues. Finally, community participation helps make a health intervention replicable in other like communities.[1-3]

The most powerful aspect of community participation in health intervention projects is that it forces the projects to address the health concerns of community members rather than the concerns of health professionals.[4] Additionally, participation encourages the involvement of community members as project participants and increases their willingness to provide detailed and accurate information. Finally, community participation in health projects results in capacity building and empowerment for the individuals who participate and the community as a whole.[5-7]

Community participation can include a variety of activities.[8,9] Plaut et al.[4] define and summarize the elements of community participation in health projects. Participatory health research occurs, they argue, when trained health professionals and community members cooperate in a joint process to critically understand and change the social situation in an effort to improve people's health. Participatory research has four elements, including the participation of the people being studied, use of the personal experiences and the perceptions of community members as data, a focus on empowerment, and a final product being action by the community and community members to change the conditions causing the problems.

While Plaut et al.'s definition is an ideal, a number of researchers have noted that, in reality, there is a broad range of what is considered community participation.[4] The range is characterized as active to passive,[10] contractual to collegiate,[11] and tokenism to degrees of citizen power.[12] Despite the effectiveness of the most active participation, reviews show that this level is rarely achieved.[11]

While the participation of communities in health research and intervention is valuable, some communities have more difficulty engaging in participation than others do.[11,12] Community residents may be skeptical of the value of the research, uninterested in it, or feel that it lacks local relevance. Not all community residents will be motivated to participate, and some of those with the motivation may lack the time or resources. Community participation may not be valued by residents, as "community participation often seems to carry more significance for outsiders than it does for the poor" (p. 1673).[11] Among those members of the community who do participate, this participation will be subject to other responsibilities and loyalties and will be neither continuous nor predictable. There is seldom a discrete community. Even within small, geographically bounded communities, there are differences in values, sentiments, and needs, and these change over time. There are also competing definitions of what it means to represent a community.[13] The research might produce results that have unintended negative consequences for those who participate. Funding agencies may demand conventional evaluation of the research (including "products"), a concept that may be foreign to the community. The research must also contend with the demands of academic evaluation (publication in refereed journals).[3] Participatory research, like all research, is affected as much by the biases, prejudices, and beliefs of the professional as by those of community members. Some community participation projects have resulted in hard feelings and strained relationships between community residents and professionals. Residents have come away with the feeling that professional involvement is only a means for the career advancement and financial gain for the professionals. Professionals often feel that their expertise is ignored and belittled when they do not come to the conclusions that community members feel are right. This tension between

communities and researchers has led some communities working with health researchers to develop protocols that establish the rules for community-researcher collaboration.[14-16]

Despite the importance of and interest in community participation in health projects, there is little discussion of how to build and enhance this participation. The goal of this article is to present a model for enhancing community participation. We argue that community participation is built by combining a variety of activities from a menu of possibilities. These activities can entail different levels of participation by different community segments, including individual community members and community organizations. Our premise is that effective community participation should result in a partnership that meets the needs and expectations of both community members and researchers. Community members expect community problems to be solved and their voices to be heard. Researchers expect their study procedures and results to reflect accepted standards of scientific practice.

We base the development of our community participation model on experience gained in PACE (Preventing Agricultural Chemical Exposure Among North Carolina Farmworkers), a participatory health project involving migrant and seasonal farmworkers, a poor and medically underserved population for whom community participation in health research could be empowering and culturally appropriate. We first present an overview of the model. Then, using PACE as a case study, we describe implementation of the model. In this case study, we describe the characteristics of the farmworker community that make participatory health projects especially challenging and then show how we have used the model to overcome the challenges to participation. The lessons learned in this case extend the method and theory of community participation.

THE MULTIMODE, MULTIDOMAIN MODEL

Our model is based on a definition of community that is multidimensional and not necessarily geographically based. It takes into account the idea that a community is a group of persons characterized by

> (1) membership—a sense of identity or belonging; (2) common symbol systems—language, rituals, and ceremonies; (3) shared values and norms; (4) mutual influence—community members have influence and are influenced by each other; (5) shared needs and commitment to meeting them; and (6) shared emotional connection—members share common history, experiences, and mutual support. (p. 151)[6]

Individuals belong to more than one community (e.g., an ethnic community, a geographically based community, a faith community). Because of the nature of communities, our model includes two dimensions on which community participation can be included, mode of interaction and domain of participation. The model, with its multiple modes of interaction and multiple domains of participation, can be thought of as a two-dimensional grid in which modes and domains form the axes. Specific project activities can be situated at the intersection of specific modes and domains. Our premise is that the more activities are spread across the grid, the greater will be the community participation, resulting in greater commitment of the community, satisfaction with and ownership of the research by a broad base of the community, and greater benefit to the researcher. Row and column totals can be understood as the outcomes of the participation process.

Modes of Interaction in Community Participation Research

Researchers can interact with communities at several different levels, each of which can make a different contribution to the research enterprise (see Table 1). At the group level, there are often existing community groups, including community-based organizations (CBOs) and churches that may have an expressed interest in the problem. These bring knowledge of the community, an interest in the problem, and an existing infrastructure to the research. Other groups can be comprised by the researchers specifically for the research process. Such groups can have the expertise deemed appropriate by the researcher and will focus directly on the problem. Communities can also be represented by single individuals. These include leaders—both natural leaders and elected officials. In addition, single individuals who are representative of the community (in more of a statistical sense) can be included.[13] Leaders bring the respect of community members and, in some cases, community resources, while other individuals may contribute a sense of the diversity within a community.

Domains of Community Participation

The model also recognizes that there are different domains of participation in which a community and researcher can interact. Borrowing from Hatch[10] and Cornwall and Jewkes,[11] we identify three domains within which interaction can take place: consultation, strategic planning, and implementation.

Consultation is the least participatory domain and includes formats in which discussion and questioning can occur. Presentations can be developed that are interactive, and time is dedicated for suggestions and responses. The venues for these discussions are in the community and can include churches, offices, and other gathering places. Many times, these discussions provide valuable input on community needs. They can also lead to increased interest in the project, and community members may decide to become more involved in the actual research.

The community can also be involved in *planning*, both in creating the project plan and making changes along the way.[4] Initially, the research staff can work with community representatives in developing the research design. As a team, the researchers and community representatives map out the general direction of the project and discuss partnership expectations. With community input in planning, the inevitable adjustments that are needed during a project can be ongoing and can make it ultimately more effective. Meetings can be held with various community representatives and stakeholders to review materials, discuss tactics for accomplishing project goals, and generate new ideas.

Implementation is the most participatory domain in which community members can function as partners in research. Partnership implies shared responsibility. For community members to feel responsible, their ability to actually conduct research must be recognized, encouraged, and facilitated. For a partnership to function successfully, partners must be able to communicate openly about accountability. By planning and working together, research professionals and community participants can develop a relationship in which performance can be evaluated in a nonthreatening manner. The implementation mode of participation suggests that capacity building should be an important outcome of a project. For community members to conduct research or develop and implement an intervention, they will need to receive technical assistance and resources.[17] Time is built into the project for training and materials. In return, it could be expected that CBOs, other groups, or individuals will share community-specific information and expertise in

Table Conceptual Model of Multimode, Multidomain Model

Model Dimension	Level	Examples of Contribution to Research
Mode of interaction	Existing community group	Knowledge of community
		Interest in problem
		Infrastructure
	Community group comprised for research	Appropriate expertise
		Focus on research issue
	Community leaders	Respect of community members
		Access to community resources
	Representative individuals	Diverse knowledge and opinions
Domain of participation	Consultation	Input on community needs
		Increased community interest in project
	Planning	Produces community ownership of project
		Improves effectiveness of research
	Implementation	Capacity building of community members

organizing with the professional staff. While this level of participation requires significant investment, the sustainability of the research is improved.

CASE STUDY: ENHANCING THE PARTICIPATION OF NORTH CAROLINA FARMWORKERS

Farmworkers in North Carolina are a medically underserved population at great risk for numerous environmental and occupational health problems. Farmworkers hold minimum-wage jobs that do not provide health insurance, thus ensuring that they have limited access to health care. There are several different sources of care that farmworkers can access, but the 13 migrant health clinics in North Carolina can in no way serve all of the state's seasonal and migrant farmworkers and their dependents. At the same time, farmworkers are at substantially greater risk than the general population for exposure to occupational injuries, communicable diseases (e.g., tuberculosis and HIV/AIDS), and dental diseases.[18-26] There is great concern about occupational exposure of farmworkers to agricultural chemicals and the short- and long-term effects of this exposure.[27-30] Farmworkers in North Carolina are overwhelming minority-group members, composed almost exclusively of Hispanic and African American workers.[31]

Because farmworkers are at high risk, poor, and underserved, and include culturally diverse minority-group members, it is extremely important to engage the farmworker community to ensure any health intervention is culturally appropriate. However, North Carolina farmworkers present special challenges that make it especially difficult for them to participate in community health projects, many of which are issues complicating health interventions among farmworkers in other parts of the country.[32]

In North Carolina, migrant and seasonal farmworkers are employed in most of the state's 100 counties. Even within a single county, they are dispersed in small groups in labor camps on or near the farm or farms on which they work. In addition, the farmworker population is mobile, moving within the state and between states and nations to follow the work needed with different crops.

The farmworker community is largely minority but includes multiple ethnic groups. The two largest segments in North Carolina are African American (10%) and Hispanic

(90%). The latter grew from a being minority just 10 years ago to its current overwhelming majority.[31] The Hispanic population is predominantly Mexican but also includes Guatemalans, Puerto Ricans, and Hondurans. The Mexicans come from different states; for many members of this Hispanic population, their first language is not Spanish but a Native American language.

Farmworkers in North Carolina lack political and social organizations. As an occupational group, they have no union, although the Farm Labor Organizing Committee is currently attempting to organize in the state. There is a fairly new, and small, grassroots farmworker organization, the North Carolina Farmworkers' Project (NCFP), which is a partner in PACE. Many groups in North Carolina historically have spoken for farmworkers (e.g., the Farmworkers Ministry Committee of the North Carolina Council of Churches, the North Carolina Farmworker Health Alliance), but until recently, they have not developed a farmworker network, and farmworker input is limited. Because farmworkers do not have common organizations, it is difficult for farmworkers to distribute information on common concerns, to have meetings to discuss issues, or to present a united front to government or private groups.

Farmworkers have little political power and may face compromising employment conditions. They are poor, and many fear the loss of a job for simply attending a meeting. Some farmworkers lack documentation for their legal entry and work in the United States and fear deportation if they become involved in any community activity. A growing number of farmworkers come as contract laborers on H2A visas, which ensure a short stay in the United States and make them dependent on the farmers who hire them.

Farmworkers have difficulties with communication and transportation that limit their participation in community health research. Most do not speak English, and many professionals or researchers do not speak Spanish, making it difficult for members of the two groups to communicate. There are also Indian languages and regional variations and dialects in the Spanish spoken by farmworkers. Few farmworkers have telephones, making it difficult to contact them on short notice about meetings and events or to solicit their opinions. Many do not have mailing addresses, so it is also difficult to contact them even when more time is available. They have limited access to transportation; most do not own cars, and most live in rural areas that lack public transportation. Even those farmworkers who do have cars may not have drivers' licenses, and they are therefore reluctant to risk driving long distances to meetings.

The fluid occupational status of group membership also poses problems for their participation in public health projects. Individual migrant farmworkers who work one season may not come back the next season. Seasonal farmworkers, who may stay in an area for many years, may change jobs and so stop being farmworkers. In fact, rural North Carolina communities see a steady settling out of farmworkers to work in local manufacturing, food processing, and service industries.

In summary, farmworkers constitute an occupational community with attributes that make them especially appropriate for community participation in health projects. These attributes are also challenges to farmworker participation in these projects, which must be addressed so that successful participation can be developed and maintained.

The PACE Project

PACE is a community participation health project that addresses health concerns surrounding farmworker occupational exposure to agricultural chemicals. It was initiated as a partnership of university (University of North Carolina at Chapel Hill, Wake Forest

University School of Medicine, and North Carolina State University) and community representatives (the NCFP). PACE is a 4-year project funded by the National Institute of Environmental Health Sciences as part of their Community Based Prevention/Intervention Research Project in Environmental Health Sciences initiative (RFA ES-96-008). The desire to respond to the RFA came initially from the university researchers who had been involved in issues of migrant health and saw this program as an opportunity to address the specific issue of chemical exposure. The NCFP, as a community-based organization, became involved in the early stages of proposal development.

The goal for PACE is to reduce agricultural chemical exposure among farmworkers by using community participatory research to develop (through formative research), implement, evaluate, and disseminate culturally appropriate interventions. Community participation is designed into each of PACE's components; first-year activities focus on activities designed to promote broad-based community participation during the development of the intervention, as a foundation for the subsequent steps in the project. In addition to the participation of farmworkers, the PACE project has reached out to other stakeholder communities including farmers, health care providers, and the Cooperative Extension service. PACE operates in an eight-county area in central North Carolina, the region with the state's highest concentration of farmworkers.

Applying the Model for Building Farmworker Participation in PACE: Activities Implemented and Lessons Learned

Five modes of interaction are used to engage the farmworker community in PACE. These are partnership with a CBO, a project advisory committee, community forums, public presentations, and formative research. The use of these different modes allows PACE to engage a variety of segments of the farmworker population. Table 2 shows the different activities, by domain of participation, carried out in the first year of the PACE project.

Partnership With a Community-Based Organization

The starting point for PACE was to consult with the NCFP, a nonprofit community-based organization that was started in 1991 and incorporated in 1994 to provide a forum for farmworkers to collectively resolve common problems and promote self-advocacy. The NCFP is a full partner in the PACE project. As a subcontractor with the University of North Carolina, two NCFP staff members are listed as coinvestigators on the PACE grant, with parts of their salaries and NCFP operating expenses paid by the project budget. The input of NCFP during proposal development was important, and its ongoing participation is critical to the success of the PACE project. As a community-university partnership, the PACE project has benefited from hearing from farmworker representatives on major decisions and in planning future activities. As PACE staff members, the NCFP investigators attend the monthly staff meetings at the university in Chapel Hill. University project staff travel to the NCFP office in Benson, North Carolina, usually several times per month. It is during these regular site visits that strategies for farmworker participation have been developed.

The NCFP staff work on the implementation of project tasks in addition to consulting and planning these tasks. For the formative research, the NCFP staff identified and recruited interview participants, arranged for focus group interviews, conducted some of

Table 2. PACE (Preventing Agricultural Chemical Exposure Among North Carolina Farmworkers) Community Participation Model: Specific Activities by Modes and Domains and Their Outcomes

	Domains of Participation			
Modes of Interaction	Consultation	Strategic Planning	Implementation	Outcomes of Multidomain Participation
Partnership with a community based organization (CBO)		CBO and staff collaborate on original research design		CBO staff receive training and become identified with PACE
		CBO and staff collaborate to fine-tune design during conduct of project	CBO and staff develop intervention	Research protocol reflects balance of community needs and scientific design
				Research accomplished by community members
Advisory committee (AC)	Staff and CBO inform AC about project activities	AC advises CBO and staff on data collection and implementation strategies		Research plan matches scientific design needs and community concerns
Community forums	CBO leads presentation and discussion of project in community, with staff support	Small-group breakout sessions for planning and evaluation of intervention materials		Wider community is involved in designing intervention
Public presentations	Project staff and CBO present information on project at meetings of existing organizations			A broad base of stakeholders are informed and have input
Formative data collection	Farmworkers complete in-depth individual and group interviews			Experiences and opinions of multiple farmworkers are considered in intervention design
Outcomes of multimode participation	Wide range of community segments are informed about project	Community is involved in planning project and has a stake in its outcome	Community actively participates in conduct of research	Broad-based involvement of community in research after 1 year of multimode, multidomain activities
	Input is received from a full range of community members and representatives			

the interviews, and participated in data analysis. They have worked to establish participatory networks in the community; these efforts are discussed below. They have used their networks to farmworker groups across the country to locate existing intervention materials, and they have participated in the project's critical review of these.[33] A partnership with the NCFP was also important in developing the intervention. A series of meetings of the university researchers, the project coordinator, and the NCFP staff were held to develop the components of the intervention. The result of several months of work was a training package on pesticide safety that included a health-promoter workshop combined with an on-site Environmental Protection Agency Worker Protection Standard–certified training.[34] Suggestions for the content and format of the training package were also received through input from the advisory committee and the community forums, described below. The NCFP staff helped to define and contextually interpret what was said at these community meetings to create an intervention that was practical and culturally appropriate. The NCFP will present parts of the intervention to farmworkers.

Despite having different perspectives on the conditions of farmworkers, the university and CBO staff members have become partners due to a common recognition of the importance of the project goals and of the scientific value of the collaboration.[35] The high level of participation has led to important outcomes for the NCFP. The research and intervention are being accomplished by members of the community, leading to a commitment to and ownership of PACE. The CBO staff members have acquired new skills, and the organization has built its capacity to undertake future projects. This is particularly important because it is already helping the CBO compete successfully for funding for other projects and to expand its activities. During PACE, CBO staff learned to conduct focus groups and in-depth interviews and to systematically analyze the results. Working with the university researchers, they also developed skills for organizing community forums.

The PACE Advisory Committee

The PACE advisory committee has as its explicit goal bringing together members of the most relevant communities (farmworkers and farmers) and the two groups that provide services to them (health care workers and Cooperative Extension agents), with the PACE staff as facilitators. The advisory committee provides a place where farmworkers can speak for themselves and where farmworkers and farmers can interact directly. This is accomplished by not including, as members of the committee, government officials, advocacy groups, and others who have traditionally taken it upon themselves to represent farmworker or farmer concerns without the meaningful participation of their constituents. The grower members are not the employers of the farmworker members.

Participation of farmworkers on the advisory committee presents several challenges. Transportation is a big issue, as well as the time and place of the meetings. NCFP staff members currently check with farmworker committee members a few days before meetings and arrange to provide transportation if needed. The meetings are held in the evening, after work hours and at a location that is near to the farmworker committee members. In an effort to make the farmworker members feel more comfortable, neutral settings such as churches are selected as meeting sites. Initially, the advisory committee meetings were set up on a rotational basis, to be held in different towns in the study area. While the health care providers and growers liked this idea because it staggered their driving times, the farmworker members found it difficult to travel long distances and to try to locate meetings in unfamiliar places. A decision was made after the third meeting to house the

advisory committee at a central location in the study area. Interpretation is provided, and the atmosphere is informal, with children often present. The format of the meetings is also considered; farmworkers are encouraged to participate by allowing enough time for input from the committee members and discussions in small groups.

Farmworker representatives were recruited by the NCFP and are often transported to the committee meetings by NCFP staff members. While the NCFP as a CBO often represents farmworkers in the press and at other meetings, it encourages farmworker members of the advisory committee to speak as individuals. The presence of NCFP leaders provides support to the other farmworkers as they make comments and interact with the health care providers and the growers on the advisory committee. Because it is such a rarity that farmworkers are a part of programmatic planning and oversight, their role is very much respected by the other committee participants. Growers, Cooperative Extension officials, and the health care providers solicit considerable information during the meetings, and they report that the advisory committee is one of the only forums where they can carry on an open dialogue with farmworkers.

In general, committee members express satisfaction with this mode of participation. The farmworker members are also comfortable enough to be critical of the process at times. For example, at one meeting, several farmworker members were concerned because one of the handouts shown to the committee was not translated into Spanish. This kind of oversight continues to play an important role in ensuring that the intervention meets the needs of the target population.

The farmworkers on the advisory committee are involved in the consultation and strategic planning domains (see Table 2). Project staff make presentations at the committee's quarterly meetings, and members of the committee discuss project activities. Farmworkers on the advisory committee have provided critical evaluation of the feasibility and cultural appropriateness of the intervention to be tested. The outcomes of this participation on the advisory committee are that farmworkers are informed and have some input. For the PACE project, this has helped to bring together scientific and community concerns.

Community Farmworker Forums

Before the intervention was finalized, PACE staff held two forums to publicize the study to the farmworker community and to respond to questions and concerns. For example, at the first of these forums, 20 farmworkers attended and the audience was broken down into small groups in which participants reviewed educational materials and discussed the problems of trying to reduce exposure. Project staff members served as facilitators. A dinner was provided, and PACE project staff members were able to talk to farmworkers on an individual basis in an informal social setting.

As with advisory committee meetings, organizing participation in the forums is difficult. Identifying and involving individual farmworkers, publicizing the forums, and arranging for transportation are important activities of the NCFP. Project staff also try to expand participation in the forums to farmworkers who are not regular members of NCFP activities, as those farmworkers who do not have the opportunity to work with this CBO may have views that differ from the organization's regular clients. In fact, this has been the case, and farmworkers who are not regular members have provided a wider community perspective on the proposed intervention. The NCFP provided considerable input in planning for and organizing the community forums. After several strategizing sessions, it was decided that it was important to bring farmworkers together at a time and a place

convenient to them. The time chosen for the forums was Sunday afternoon, when most farmworkers have a day off. A local church with a Spanish-speaking congregation and the NCFP office were chosen as the sites for the forums. NCFP staff recruited farmworkers to attend and reminded participants the day of the meeting. Transportation was arranged for those who did not have access to cars.

While these forums are important to keep the community informed about project activities (consultation), they also provide an opportunity for project staff to interact with farmworkers and provide farmworkers opportunities for discussion and criticism (strategic planning) (see Table 2). The project staff do not simply present information to the community about ongoing activities. Rather, opinions are solicited using techniques from popular education. Reactions to the research are written down and discussed, and key points are clarified at subsequent PACE staff meetings. By valuing the knowledge and experiences of farmworkers, important insights are gained, and further participation can be encouraged. The farmworkers in attendance have been able to review and comment on a video and other intervention materials. Additionally, in the small-group settings, the farmworker participants developed detailed lists of impressions and suggestions. During the dinners after the community forums, several farmworkers have stated that they appreciated the opportunity of being involved and relating their opinions. As a process, this type of participation is a step toward increased ownership and sustainability.[1,36] For example, at the second community forum, the farmworkers disagreed with the intervention format that the project staff was proposing. The original design for the intervention was based on training health promoters from each site, who would serve as resources and educators for their work groups. This design was presented to a group of farmworkers at one of the community forums in the form of a skit, showing how a health promoter would interact with coworkers. While the reaction of the audience was positive, participants raised some important concerns. They stated that a coworker promoter might not be taken seriously and might even be ridiculed. They suggested having an outsider, like a health outreach worker, work with the health promoter to reinforce the seriousness of the message. This forced the PACE staff to rethink the approach. In the end, the approach was modified, although some of the original format was retained.

Project Presentations

These presentations are part of the consultation domain (see Table 2), providing information to community members but with little chance for direct and immediate participation. These presentations take several forms. The NCFP staff members have daily opportunities to speak informally with groups of farmworkers. They routinely describe PACE to these groups. In addition, newspaper releases were written for the Spanish-language press and published, and the NCFP gives regular updates on PACE activities in its newsletter. PACE sponsors an adult soccer team in the regional Hispanic league. Fliers distributed to spectators at games describe the project and its activities.

Formative Data Collection

The formative data collection itself is a direct way to capture the voices of the community.[4,32] The design and results of this component of PACE are presented elsewhere.[37] During 26 individual in-depth interviews and seven focus groups, farmworkers described their experiences with and beliefs about agricultural chemicals. Health and safety

training materials were also presented in the interviews and focus groups to stimulate discussions of work practices and training needs. Several farmworkers who were interviewed became more interested in the project and assisted in recruiting other interviewees. Farmers were also interviewed during the formative research. Their reactions to the interviews were also generally positive and provided important contacts for future project activities. For example, one farmer who was interviewed helped arrange a focus group of farmworkers and became a member of the advisory committee. Interview participants were given a token cash incentive for completing interviews. In several instances, farmworker respondents misunderstood the incentives and tried to pay the interviewers because they wanted to be able to tell someone about their experiences.

To establish contacts with farmworkers for these interviews, the university staff worked closely with NCFP staff. A series of introductions were made, and farmworkers were visited in their homes, in the workplace, and in other gathering places. This served to establish project staff in the social network, and they received further references. Efforts were made to recruit farmworkers to participate in these interviews from sources other than the NCFP. Project staff worked with different service providers, including health outreach workers (some of whom were former farmworkers) and farmers, to meet and recruit participants.

A personal contact or a reference was essential during the interview process. Almost all of the farmworkers contacted through intermediaries consented to be interviewed. However, when there was no reference, some farmworkers declined. For example, after one interview in a trailer park, a member of the NCFP tried to find others nearby that would be interested in talking. Because the NCFP representative was not very well known in this trailer park, he was unable to complete another interview. With the lack of a reference, the other farmworkers were naturally suspicious or at least more defensive.[11] As with most relationships, a partnership in community-based research takes time and effort to develop.

The analysis of the interviews provided insight into the belief systems of farmworkers and farmers about exposure to agricultural chemicals.[37] The interviews also provided information about the relative value of different training and educational materials. As one example, the farmworkers interviewed generally favored watching a video as long as it showed actual work conditions. As the intervention was being developed, the interviews were referenced, and the perspectives of the farmworkers were taken as a starting point.

Summary of PACE Activities

As summarized in Table 2, the multimode approach to farmworker participation includes a number of stages. These can be seen as a process of outreach to the farmworker community. At the first level, work plans were developed with a community-based organizational partner at the university. An advisory committee was then created, and representative farmworkers provided input in a more neutral setting. Participation was later extended through community forums, and public presentations were held in places where farmworkers regularly gather. Finally, members of the farmworker community participated as informants in the formative data collection.

The majority of farmworkers in North Carolina do not speak English. Some farmworkers in the study area speak an indigenous language such as Mixteco as their native tongue. To this point, all of the farmworkers that speak these languages also speak at least

basic Spanish. To create open lines of communication, PACE has made Spanish translation and interpretation priorities in all the domains of participation. Interpretation is provided by PACE staff at all advisory committee meetings, community forums, and public presentations. Educational materials and handouts are developed with members of the NCFP and then translated to Spanish by a professional translation service.

Because other community systems are also connected to the work environment and provision of services to farmworkers, we have attempted to include participation from three other communities in PACE: farmers, health care providers, and Cooperative Extension. The multidomain, multimode community participation has provided a framework for developing the participation of those groups as well. For each of these communities, the activities undertaken have been chosen to reflect community-specific challenges.

DISCUSSION AND IMPLICATIONS

The application of this multidomain, multimode model has implications for future community participation research and intervention projects. These implications include the improvement of the science through diverse community participation as well as the importance of ownership to continued community participation. However, the most important implication is the need for flexibility and diversification in the implementation of community participation projects. The development of this community participation model also poses important questions for future projects.

Community participation in research can enhance scientific integrity. As Brown[38] notes, "good science" can become better because community involvement leads researchers to valuable information that would otherwise be unavailable for tailoring interventions and research design to the community. Developing several modes of community involvement has the potential for making good science even better. Researchers gain a more complete picture of the community than what more narrow community involvement may produce. Community involvement can also produce a fundamental change in the orientation of researchers by making them better listeners and by making them more willing to invest the time and energy to meet communities on the communities' own terms.

In this model, we acknowledge that community participation can take a variety of forms in the same project and that there is a continuum from relatively passive to more active. Community participation can occur in several domains through several modes. We have demonstrated that this multidomain, multimode approach is especially relevant when the community presents the challenges to participation that we found among North Carolina farmworkers. We suspect that more communities than not present these types of challenges and that these challenges, like all negative results, simply are underreported. Exceptions include the report by Sharp et al.[17] and the discussions of Cornwall and Jewkes[11] and Robertson and Minkler.[12] All of those working on the PACE project realized that the CBO partnership alone would not lead to the level of participation needed to make the intervention appropriate or sustainable and that community participation is more than working with a CBO. Therefore, we had to look for different access points to community members to expand the range of those participating. This was accomplished with the help of the CBO and was facilitated by the CBO acknowledging that not all members of the community were active in—or even agreed with—the organization. This acknowledges the problem of which community is participating.[11-13,35] The project can get perspectives

different from those of CBO members and improve the product the project is developing. There is payoff for the CBO by letting more community members know about the CBO and thereby expanding its potential constituency.

A multilayered approach to participation also highlights the ability of researchers to go beyond simply working with representatives of a CBO. While CBOs do have ongoing contact with a portion of the community, they do not represent everyone. An enhanced participation model allows for opportunities to reach out to other stakeholders. When carefully planned, the CBO can help researchers contact members from the wider community. In addition, activities can be designed that will engage participants that are outside the CBO's sphere of influence.

Developing participation with different community segments helps projects overcome those instances in which participation by a specific community partner may fluctuate. Key participants may leave, research may be dropped in order to deal with a local crisis, or the commitment of community members may decline if expectations for change are not immediately met. Participation cannot be plotted as a steady and continuous input into the research process.[11]

Another layer of participation is working with communities other than the one that is the project focus. Because communities have a social reality beyond space, different communities often exist in the same place at the same time.[6] Acknowledging and working with these overlapping communities may be essential to a project's success.

This multidomain, multimode model of community participation also broadens the methods of developing participation and the methods for completing a project. Different modes of interaction can be used to engage different segments of the community. For the PACE project, public presentations have been used to inform the least involved community members, while community forums are used for more involved members, and the advisory committee is used for those community members who can be very involved. Many approaches could be used for engaging the community, depending on members' desired levels of participation and their educational and technological resources. These approaches include radio call-in show formats (similar to the *Radio Pesticida*[39] format for pesticide education), places to send letters, and computer bulletin boards.

This multidomain, multimode model of community participation raises several questions in understanding and developing community participation. First, what is the effect on a community participation project of going beyond a CBO partner? Trust is an important and often hard-earned component of the relationships between academic and community partners. A CBO may not acknowledge that it does not represent the entire community, or it may feel politically threatened if it must acknowledge this. The academic partners' inviting other communities to participate may rupture a relationship with the original CBO. We are fortunate in the PACE project in that the NCFP staff realized that there were many farmworkers that had to be brought into the project and worked with the academic members of the team to do this.

The second question addresses the issue of the nonorganized community. Communities burdened with the problems of environmental injustice, as well as other significant public health issues, are often communities faced with many competing social issues, including poverty and low educational attainment. CBOs may not have developed in these communities or are sometimes short lived due to the lack of resources. Yet these communities, like farmworkers in North Carolina, would benefit from community participation in health projects. Can community participation methods be developed to work with communities that have no CBOs? The limited staff and relatively recent organization of the NCFP in North Carolina indicate that nascent CBOs can play major roles in

participatory projects. In this case, the ethics of abandoning a newly developed CBO once a project has ended is an important consideration. The multimode approach in our model suggests that even without a CBO, participatory projects can be implemented.

Finally, does broadening community participation in a multimode and multidomain model increase such desired ends as capacity building and sustainability? Extending participation and ownership of a project to multiple constituencies broadens the groups that have the opportunity to participate, that become aware of the problem, and that understand that they can effect change. With more community members involved and owning the project, there is a greater force for continuing the project outcomes (e.g., lower exposure to agricultural chemicals in the workplace). However, what will happen when project funding ends or the CBO collapses? The involvement of other stakeholders, in our case, health care workers and Cooperative Extension agents, will help ensure the long-term influence of the project.

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