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Participatory Research and Service-Learning Among Farmers, Health Professional Students, and Experts: An Agromedicine Approach to Farm Safety and Health

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ABSTRACT. Agromedicine developments in Alabama rest heavily on the interest and support of the farm community. Participatory approaches have been advocated in order to impact the safety and health of farms. The University of Alabama Agromedicine Research Team, working closely with and guided by farmers, places emphasis on identifying areas of farmer concern related to agricultural health and safety and on developing jointly with the farmers plans to address their concerns. Agricultural extension agents were key to developing the trust relationships among farmers, health professionals, and extension personnel required for these successful agricultural safety and health developments. In this article the authors describe how the research team engaged farmers in participatory research to develop service learning activities for graduate students studying Agricultural Safety and Health at The University of Alabama. Accepting farmers' active role in research processes creates an environment that is favorable to change, while providing farmers reassurance that their health and safety is of utmost importance to the researchers.

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INTRODUCTION

The agricultural community shares with the greater rural population obstacles of geographic distance to health care,[1,2] while also experiencing the same magnitude of occupational and environmental risks associated with mining and construction.[3] Stoic attitudes, lack of occupational health regulations affecting most farms, and distrust of bureaucratic and governmental officials are additional barriers to effective farm health and safety.[4,5,6,7] Furthermore, few health professionals are trained in occupational and environmental health issues specific to agriculture (e.g., agricultural medicine[6]) or in the partnership approach to engage farmers, their families, and workers in health promoting activities (e.g., agromedicine[8]). Even the organized research promoted by the National Center for Occupational Safety and Health (NIOSH) to develop a scientific basis for safety and health in agriculture, forestry, and fishing has not proven effective for translating knowledge into health actions on the farm.[7]

Recent proposals call for participatory approaches to engage the farm community with researchers in the effort to affect healthy changes.[9,10] This engagement requires deliberative dialog among researchers and farm populations to come to mutual understandings of expectations and roles before productive research can be accomplished. Community-based participatory research has been useful among some farm groups.[11] The Cooperative Extension System has a record of leadership in engaging in deliberative and participatory actions to effect programs that support the livelihood of those involved in agriculture.[12,13] The Extension Agents have been key to the identification of potential agricultural partners, opening doors, and providing a platform on which to build trusting relationships within the farm community.

Farmers have indicated that if medical personnel understood better the farming culture that the medical care process for the agriculture community would be improved.[14] For this purpose, representatives of the farm community have entered into partnership with the University of Alabama Rural Medical Scholars Program (RMSP), Tuskegee University Cooperative Extension Program, and Alabama Cooperative Extension System. They propose to help produce rural physicians who are culturally competent in the care of farm families and workers and knowledgeable about the care needed.[14,15,16]

The health and safety of Alabama's agricultural community is both a focus of the Rural Health Leader's Pipeline (RHLP) at the University of Alabama and the impetus for the development of the Alabama Agromedicine Program over the past 15 years. One component of the RHLP is the Rural Medical Scholars Program, a program to "grow your own" rural physician.[17] The RMSP is a five year track of medical education which includes a pre-matriculation year of study and four years of medical school and is open to college seniors and graduate students, offering a Master's degree in Rural Community Health. The RHLP also offers the Master's degree to graduate students who are interested in rural primary care and are continuing to prepare for medical school application. The program requires the pre-medical and RHLP graduate student to complete a research project as a culminating activity for the Master's degree. Over the years, several Rural Medical Scholars and graduate students have chosen to conduct projects in farm safety and health. In this article the authors describe the development of the relationship among researchers, extension, and farmers to facilitate participatory research, the process for identifying researchable topics, and students' service-learning projects that have resulted.

RELATIONSHIP DEVELOPMENT

Early Development

The Alabama agromedicine relationship grew out of Alabama's Women Involved in Farm Economics (WIFE) interest in the South Carolina Agromedicine Program in 1990.[15] This organization's primary goal was to improve the health care of their farm families and ultimately impact the health care of farmers throughout the state. WIFE's initiative gained the interest of the Alabama Farmers Federation, a statewide organization of farmers, and the Alabama Cooperative Extension System (ACES). Diverging from other models of agromedicine, this farm community-academic medicine-extension collaborative in Alabama agreed its first priority was to develop a pipeline to produce locally grown rural physicians[8] and its second priority was to prepare these new rural physicians in the agromedicine approach.[18] Subsequently, these collaborators worked to support development of the Rural Health Leaders Pipeline to bring rural children into health professional education[19] and to involve farmers in providing educational farm field trips for medical students in the pipeline.[16] This work was highly productive, generating interest among the students,[20, 21] publications, grants, leadership positions in the North American Agromedicine Consortium, and an endowed scholarship fund of $1.8 million from the Alabama Farmers Federation. The endowed scholarship signaled to farmers widely across the state that the Alabama Agromedicine Program/Rural Health Leaders Pipeline was a partner with Alabama's farm community. In 2006, the Alabama Farmers Federation supported the Alabama Agromedicine Program/Rural Health Leaders Pipeline as it hosted the annual meeting of the North American Agromedicine Consortium.

County extension agents played a critical role in generating this goodwill among farmers and RHLP programs. These agents matched students with farmers, conducted farm visits, and facilitated discussion. Field trip participants observed farms related to cattle, soybeans, catfish, sugar cane, cotton, poultry, timber, pork, hatcheries, nurseries, and more. These field trip experiences were a positive stimulus not only for the endowed scholarship, but also for greater farmer expectations about the health sector's attention to farmers' health concerns. These experiences, and the trust gained from them, became the foundation on which to build participatory research and service learning activities of the Alabama Agromedicine Program.

Policy Group Formation for Participatory Research

The extension agents, farmers, and medical faculty sensed from their different perspectives the potential for further development. A sequence of meetings was held to discuss strategies. These meetings involved members of WIFE and Alabama Farmers Federation, as well as farmers, extension agents, and medical faculty who had been central to the previous successes. These meetings led to the development of a policy group who then supervised the development of a questionnaire and focus group directives for collecting data about farmers and their concerns and determined to provide continuing review of information collected and authorization for use of the results.

FOCUS GROUPS TO DISCOVER ACTIONABLE TOPICS

Initial Study

The policy group chose to initiate use of the questionnaire in the West Alabama region where it drew strength from its predominant poultry and beef cattle farms, most of which were 100 or more acres and provided the principle livelihood for the farm family. For purposes of this study, these farms will be labeled "large" scale. The anonymous questionnaire included 58 questions related to farming, including work on and off the farm, family and non-family workers, farm activities, products, stresses, barriers and benefits, risks/hazards, general and occupational health, community relationships, acres farmed, relationship with

physicians, and demographics (age, race, education). Concerned about the farmers' willingness to complete the questionnaire, the policy group decided to integrate the questionnaire survey with another required meeting of farmers. Operating under procedures approved by the University of Alabama IRB, the policy group chairman introduced the potential of the study, the local extension agent provided an explanation, and a medical faculty member was present to administer the consent forms and answer questions. Thirty-six of 37 farmers present, completed the questionnaires.

The policy group reviewed the questionnaire responses and requested that the medical faculty provide a formal analysis to summarize the concerns expressed by the respondents. These concerns are described in Table 1.

The policy group felt that this summary was an accurate portrayal of concerns in this farm community. They believed that actions by faculty, extension agents, and students to address any of the concerns would be welcomed. However, they raised concern about the limited scope of those participating in the survey. A related concern was the virtual absence of minority farmers in the survey. Each policy group member knew of minority farmers and was aware that their different farming styles might generate a broader set or different priority of concerns. Finally, they acknowledged that success in securing funding to make a meaningful and sustainable approach to any of the issues identified would require support from a broad and diverse farm constituency. The medical faculty members and extension agents agreed to create an agromedicine research team that would sample a diverse group of farmers with statewide scope.

Inclusiveness

The sociopolitical realities of rural Alabama and its institutions of higher education and extension required a prolonged effort to create a team that could access effectively the diverse (ethnic, geographic, and commodity-wise) farm community of Alabama. As reflected in Table 2, historical events and relationships among farm groups, extension programs, and academic institutions were thinly veiled in multiple dialogs and meetings to advance the project.

The idea for an Alabama Agromedicine Project received positive feedback from all parties, which was encouraging; however, individual minority farmers did not materialize to champion the idea. The Federation of Southern Cooperatives suggested hiring a minority graduate student for that purpose. Two agromedicine research assistants were hired, one from Tuskegee University and one from Alabama A&M, and both from rural Alabama. The Federation of Southern Cooperatives introduced them to its membership and the door to the community of small scale minority farmers swung open. Tuskegee University Cooperative Extension Program followed suit by designating a senior extension agent to further assist in gaining access and building relationships with these farmers.

The research assistants discovered that small scale minority farmers responded best to small focus group discussions and that reading assistance with questionnaire materials helped some. In addition, they found that the questionnaire would need modifications to reflect additional interests among this group of farmers. With University of Alabama IRB approval, the research assistants worked with the agent

TABLE 1. West Alabama Large Scale Farmers' ($N = 36$) Concerns to Inform Rural Physicians

1. Environment: Work conditions, dusts, smells, chemicals, allergens, machinery, large animals.
2. Nature of farm work: Time demands, hours worked, work ethic, strenuous nature, experience required.
3. Stress and economics: Stress of uncertainty, income/expenses, lack of job-related health insurance.
4. Risk/hazards of farming: Accidents, danger, hazards of equipment and animals, disease possibilities related to animals and production farming.
5. Farming culture: Illness behavior of farmers, tolerance of pain, farming lifestyle, expectations that farming families have of farm life, physicians unfamiliar with farm culture.

TABLE 2. Racial Heritages[1] Affecting Sociopolitical Contexts for Alabama Agromedicine Efforts

Collaborators	Black heritage	White heritage
Farmer groups	Federation of Southern Cooperatives	Alabama Farmers Federation
Extension organizations	TUCEP	ACES
Academic institutions	Tuskegee University, Alabama A&M University	University of Alabama, Auburn University

Note. Abbreviations: ACES=Alabama Cooperative Extension System, TUCEP=Tuskegee University Cooperative Extension Program.

[1]These categories are not mutually exclusive, but illustrate the predominant identities of various collaborating institutions and organizations based on their historical patterns of development. For example, Tuskegee University and Alabama A & M University are Historically Black Colleges and Universities (HBCU's); The University of Alabama and Auburn University are state institutions that continue to pursue diversity as a valued goal to be obtained. The Federation of Southern Cooperatives developed largely as a vehicle to sustain small scale, usually minority farmers. The Alabama Farmers Federation developed with a membership most closely identified with larger scale, usually Caucasian, farmers.

TABLE 3. Limited Resource Minority Alabama Farmers' ($N = 25$) Concerns to Inform Rural Physicians

1. Environment: Chemical exposures, allergies, water quality, and outdated machinery.
2. Healthcare: Physical health of farmers, care for farm families, and need for local physicians and healthcare facilities.
3. Nature of farm work: Various types of limited resource farms, requirement of a broad general knowledge, hours worked/time demands, and special needs of these farms.
4. Stress and economics: Financial concerns and mental health needs.
5. Health and safety: The need for worker safety and knowledge of and use of proper personal protective equipment while farming.

to establish a steering committee and to convene three focus groups composed entirely of minority farmers. Under the supervision of this committee, the research assistants conducted focus groups with qualitative discussions that were supplemented by completion of the modified questionnaire. A summary of the concerns voiced by this group of farmers and certified by the steering committee is shown in Table 3.

Integrative Approach

The agromedicine team convened a joint meeting of the policy group and the steering committee, and this enlarged group reviewed the findings previously endorsed. This group concluded that commonalities among the smaller groups were too obvious to ignore, health care and safety were common priority concerns, and strength would exist in a unified effort. Consequently, the two groups decided to consolidate into one policy committee with members from each of the two existing groups. This policy committee's first order of business was to instruct the agromedicine study team to expand the focus group study statewide, involving groups that were representative of both large and small scale farmers. This effort is ongoing, generating student-centered research and publications.[14] Second, the policy committee endorsed student efforts to develop programs responsive to safety and health needs of Alabama farmers.

SERVICE LEARNING IN AGROMEDICINE

Agricultural Safety and Health

The University of Alabama RHLP Master's program selected and incentivized students (via stipends) to address agricultural safety and health as their concentration of study, which led

them into farm fieldtrips, relationships with the extension agents and farmers, and farm-centered projects. Students worked collaboratively on research topics which had emerged from the health and safety priority areas endorsed by the policy committee. As stated previously, the guiding question for the Alabama Agromedicine Program is "What do Alabama farmers want local health care providers to understand about their farm and farm families to better meet their needs?" Pursuing this objective while supervised by academic faculty, extension agents, and the farmer's policy committee, graduate students planned and implemented two farm assessments. The students were interested in determining: (1) What information will a comprehensive health and safety inventory of a farm disclose? and (2) What farm specific responses will be generated from a comprehensive health and safety assessment?

Methods

The projects employed common methods, which were modeled by the Alabama agromedicine program developments noted above. First, the students worked with their extension and medical faculty advisors to identify participant farms. Second, they worked with their advisors and the farm operator or owner to develop an agromedicine project team for each farm, identifying the farm operator or owner as the team chairperson. Third, they convened their teams at the participating farms to (a) hear the farmers' initial concerns, (b) organize the teams, which matched students with a participating extension agent, occupational medicine physician, family nurse practitioner, industrial hygienist, and agricultural safety engineer, (c) make preliminary "walk-throughs" of the farms, and (d) make literature review assignments. Fourth, the students completed literature reviews, and conducted interviews of health, safety, and agricultural extension experts, to inform their subsequent farm assessments. Fifth, informed by the literature reviews, the teams made farm visits to assess the issues through the eyes of experts on the team. Sixth, the students compiled into a report the findings of the assessments and the recommendations generated by the teams. Finally, the teams again met to review the reports and to receive further direction from the teams' farmer chairpersons about addressing the priority issues and associated recommendations.

The participating farms included the E. V. Smith Agriculture Research Facility, an agricultural experiment station closely associated with Auburn University which occupies over 3,800 acres and maintains multiple farming operations including beef, dairy, field crops, plant breeding, and a farm services support unit. The team identified several areas of interest from the farm assessment, such as, hidden dangers from confined spaces (including milk tanks, silos, combine grain tank, and grease traps), chemical storage, and livestock handling. A potential environmental hazard from petroleum fuel containment structures was also noted along with typical potential farm hazards related to equipment, silage production, animal contact, electricity, and solid waste management. All the typical hazards were well attended by the farm's safety policies. Of singular importance, the team found the farm management to have an uncommon commitment to and background with occupational safety demonstrated through periodic inspections, routine safety meetings, reference policies, and openness to review by the team of experts and students.

The second participating farm was Dee River Ranch, a 10,000 acre farm in West Alabama, involved with cattle, corn, soybeans, wheat, hay, and timber. It is a family operation with no children involved in farm work and supplemented with eight or less hired farm workers.

Using the multi-disciplinary approach described above, the team organized a farm specific review, directed by the farm co-manager, and followed the protocol of initial visit, research of issues, and comprehensive assessment to address safety aspects of the farm. The farm assessment focused on the shop/storage area, grain bins, and cattle catch pen with the team identifying the bins and the catch pen as priority hazards. Family co-managers participated in the farm assessment, review, and requested follow up planning and intervention

to improve overall farm safety, emphasizing the grain bins and catch pen.

COMPOSITE FINDINGS

Agromedicine in Alabama is being developed incrementally from ever present concerns in the farming community about an insufficiency of rural health care and an abundance of hazards associated with farming. Trust, collaboration, and unity across disciplines, institutions, and farming population groups constitute the current that carries this program into an expanding venue for serving the at-risk agricultural population. Cooperative extension agents are critical links for engaging the farm community with the health professions. Working hand-in-hand to "grow our own" rural physicians and to prepare them with knowledge and attitudes that serve the needs of agriculture strengthens the agromedicine collaboration and opens the door to more specific interventions related to agricultural safety and health.

Organizing the agromedicine program and activities such that farmers have leading authority in the development assures that the agricultural community will not resist, but will propel agromedicine advancements. The principals of community based participant action research[22,23] serves this purpose well.

Students from rural backgrounds who are preparing to become rural physicians find great support for their ambitions in the farming community. When supported by professionals who are expert in the various fields involved with agricultural safety and health, these students are motivated to work with farmers to meet farmers' needs, while at the same time advancing their own understanding of a major component of rural society. Service learning in interdisciplinary agromedicine teams is highly compatible with and promotes the development of these students as they become rural physicians and health professionals. The agricultural community is learning to depend on the farm-related educational experiences that support the cultural competence of these students to work with farmers to also address occupational health and safety concerns specific to their farming interests.

DISCUSSION

Reflecting on these findings, the impetus to expand service learning addresses the interests of rural medical education and agriculture in Alabama. With a stable stream of funding to sustain agricultural safety and health as a priority of rural medical education, these early successes could be expanded to reach a broader set of farm families and communities. The work of the agromedicine program to establish and grow relationships with Alabama's diverse farm population is reflected in the development of the policy committee. However, the work of building and maintaining trust is a continuous process requiring constant communication across such cultural divides as academic versus agricultural, and majority versus minority communities. Our work with the minority farm community continues to develop. The agromedicine team realized that application of principles of participatory research validates the trust relationships that are necessary to sustain agromedicine efforts and produces opportunity to address increasingly sensitive concerns of farmers. Our next step is to take these composite findings back to the policy committee for validation and to receive further directions that will guide us toward the expanded agromedicine effort that Alabama farmers desire and need. Identifying resources are key to the development and expansion of this work to address not only diverse farms in west Alabama, but those throughout the state.

REFERENCES

1. Ricketts TC. The changing nature of health care. *Annu Rev Public Health.* 2000;21:639–657.

2. Jones CA, Parker TS, Ahearn M, Mishra AK, Variyam JN. Health status and health care access of farm and rural populations. USDA Economic Research Service, Economic Information Bulletin No. (EIB-57), 2009. Available at: http://www.ers.usda.gov/publications/eib57/. Accessed on March 30, 2011.

3. Rivara FP. Fatal and nonfatal farm injuries to children and adolescents in the United States. *Pediatrics.* 1985;76:567–573.

4. Brumby SA, Wilder SJ, Martin J. The sustainable farm families project: changing attitudes to health. *Rural*

Remote Health. 2009; 9:1012. Available at: http://www.rrh.org.au. Accessed on September 23, 2011.

5. Kelsey TW. The agrarian myth and policy responses to farm safety. Am J Public Health. 1994;84: 1171–1177.

6. Donham KJ, Thelin A. *Agricultural Medicine: Occupational and Environmental Health for The Health Professions*. Oxford, UK: Blackwell Publishing; 2006.

7. National Research Council and Institute of Medicine. *Agriculture, Forestry, and Fishing Research at NIOSH*. Washington, D.C.: National Academy Press; 2008.

8. Wheat JR, Donham KJ, Simpson WM. Medical education for agricultural health and safety. *J Agromedicine.* 2001;8:77–92.

9. Wheat JR. Approaching actionable farm safety programs. *J Agromedicine.* 2005;10:5–7.

10. Okali C, Sumberg J, Farrington J. Farmer participatory research: rhetoric and reality. London, England: Intermediate Technology Publications; 1994.

11. Schiller LF, Donham KJ, Anderson T, Dingledein DM, Strebel RR. Incorporating occupational health interventions in a community-based participatory preventive health program for farm families: a qualitative study. *J Agromedicine.* 2010;15:117–126.

12. Francis C, King J, DeWitt J, Bushnell J, Lucas L. Participatory strategies for information exchange. *Am J Alt Agriculture.* 1990;5:153–160.

13. Gerber JM. Farmer participation in research: a model for adaptive research and education.*Am J Alt Agriculture.* 1992;7:118–121.

14. Anderson BT, Johnson GJ, Wheat JR, Wofford AS, Wiggins OS, Downey LH. Farmers' concerns: A qualitative assessment to plan rural medical education. *J Rural Health*, no. doi: 10.1111/j.1748-0361.2011.00366.x (online 15 MAR 2011; print version pending).

15. Wheat JR, Nagy MC, McKnight JT, Anderson RL. Alabama agromedicine program: rationale, proposal and supportive study. *J Agromedicine.* 1994;1:63–82.

16. Wheat JR, Turner TJ, Weatherly L, Wiggins OS. Agromedicine focus group: cooperative extension agents and medical school instructors plan farm field trips for medical students. *South Med J.* 2003;96:27–31.

17. Wheat JR, Hartman JA, Palmer TM, McKnight JT, Leeper JD. Strategy to increase agricultural medicine practice: an exploratory study to predict interest among generalists. *J Rural Health* 18:18–24;2002.

18. Davies JE, Smith RF, Freed V. Agromedical approach to pesticide management. *Ann Rev Entomol.* 1978;23:353–366.

19. Wheat JR, Brandon JE, Leeper JD, Jackson JR, Boulware DW. Rural health leaders pipeline, 1990–2005: case study of a second-generation rural medical education program. *J Agromedicine.* 2007;12:51–61.

20. Tabereaux PB, Wheat JR. Preventive agricultural medicine: a student's perspective of farmers' mental health. *J Agromedicine.* 2002;8:43–53.

21. Waits JB, Wheat JR. Preventive agricultural medicine: a medical student's perspective on an important component of rural community health. *J Agromedicine.* 1999;6:11.

22. Minkler M, Wallerstein N (eds). *Community-based participatory research for health*. 2nd ed. San Francisco, Calif.: John Wiley & Sons; 2008.

23. Reardon KM. Participatory action research as service learning. *New Directions for Teaching and Learning*. 1998;73:57–64