

Drinking Water Education for Under-Served Communities

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Abstract

This proposal applies a new extension education concept for drinking water protection programs addressed to low income, under-served, and minority populations in rural and urban areas. It follows a successful CSREES-funded pilot project that used paraprofessionals from the targeted community to reach the target audience. This proposal will employ additional techniques such as mobilizing volunteers through local community centers, tap minority landowner organizations, churches, engage small rural communities with Rural Utility Service, establish riparian demonstration projects, promote environmental quality incentive educational programs, use GIS techniques to explain risk assessment concepts, and promote good decision-making techniques.

The target area is composed of two counties; Okfuskee, and, Okmulgee. These counties are among 1006 counties in the 11 Southern states with rural populations having poverty rates as high as 40% and more than 40% of working age persons without high school diplomas. Coupled with an aging demographic and widespread distrust of government, this target audience poses challenges for any extension educational program.

The outcomes of the project will be measurable improvements in drinking water quality as well as increased understanding of factors that determine the quality of private and community drinking water supplies

Project Description

Deep Fork watershed includes numerous underserved, minority communities in a nine-county area extending from Oklahoma and Logan counties in the west to Okmulgee County in the east (Figure 1). The area includes pockets with low economic structure, weak educational systems, and declining natural resources. This leaves open many targets for educational strategies to protect drinking water and protect and improve the resource base. Extension education in these communities can help residents to address many of their own environmental needs.

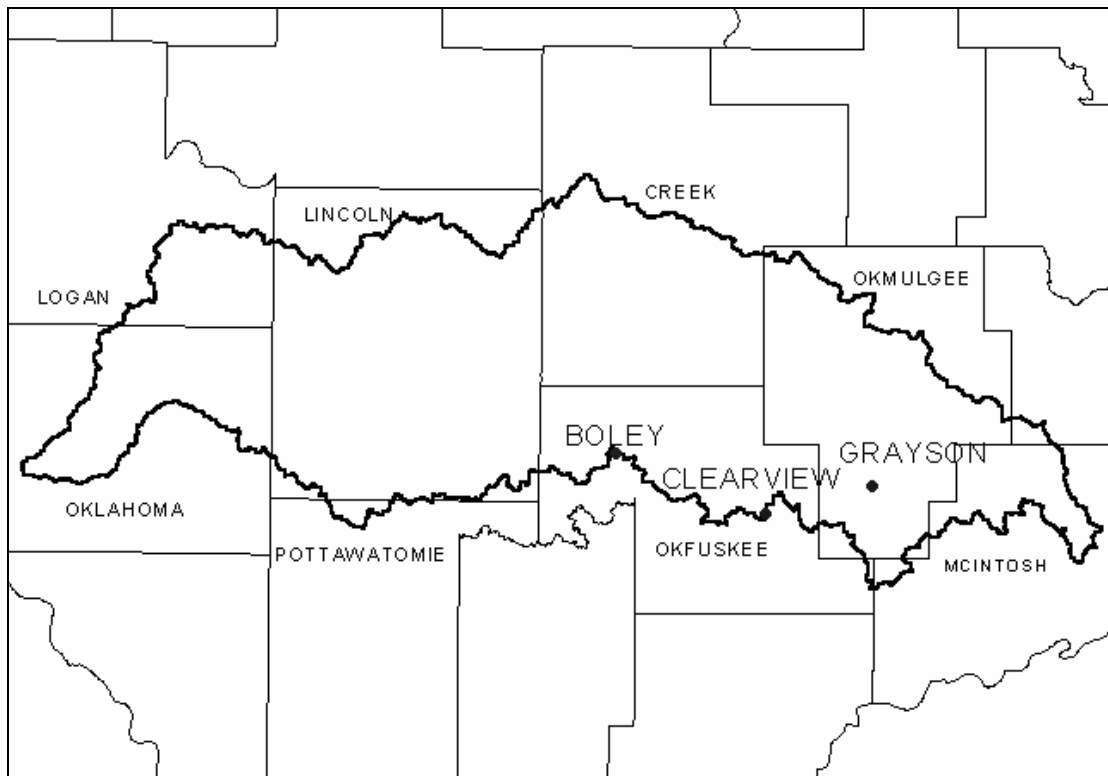


Figure 1. Target Communities in Deep Fork Watershed

Rowley and Freshwater (1999), in a study of technology in rural areas, showed Oklahoma as one of the 11 states with non-metro counties having more than 40% of working-age persons lacking a high school diploma, more than 25% of the population in poverty, and high proportion of minorities.

Rurality includes dimensions of distance, small groupings or sparseness, unique social interaction patterns, culture, occupations, and quality of life (Wimberley, 1995). Wimberley & Morris (1995) also show that southern minority and rural counties have consistent poverty, poor employment, low incomes, limited education, poor health, and high infant mortality. Also, non-metro areas have higher percentages of both elders (over 65 years of age) and youths (under 18 years of age), thus increasing the poverty ratio.

Okmulgee and Okfuskee counties have been selected as the target area for this project because of the large number of minority communities, largely African American and American Indian. (Minority communities for this project are defined as having more than 10 percent minority populations other than white.) The 1990 Census shows a majority of the target area had communities with more than 10% minorities shown on Figure 2. The percentage of families in the target area that are below the poverty level ranges from 34 percent to 74 percent. Fifty-one percent of these communities suffer poverty rates in excess of 40 percent.

In addition to the typical characteristics noted by Wimberly and Morris (1995), Rowley and Freshwater (1999), and others, there is widespread distrust of government programs and

government workers in these areas. Overcoming these obstacles requires educational materials and programs be modified to have involvement from of the people from the community.

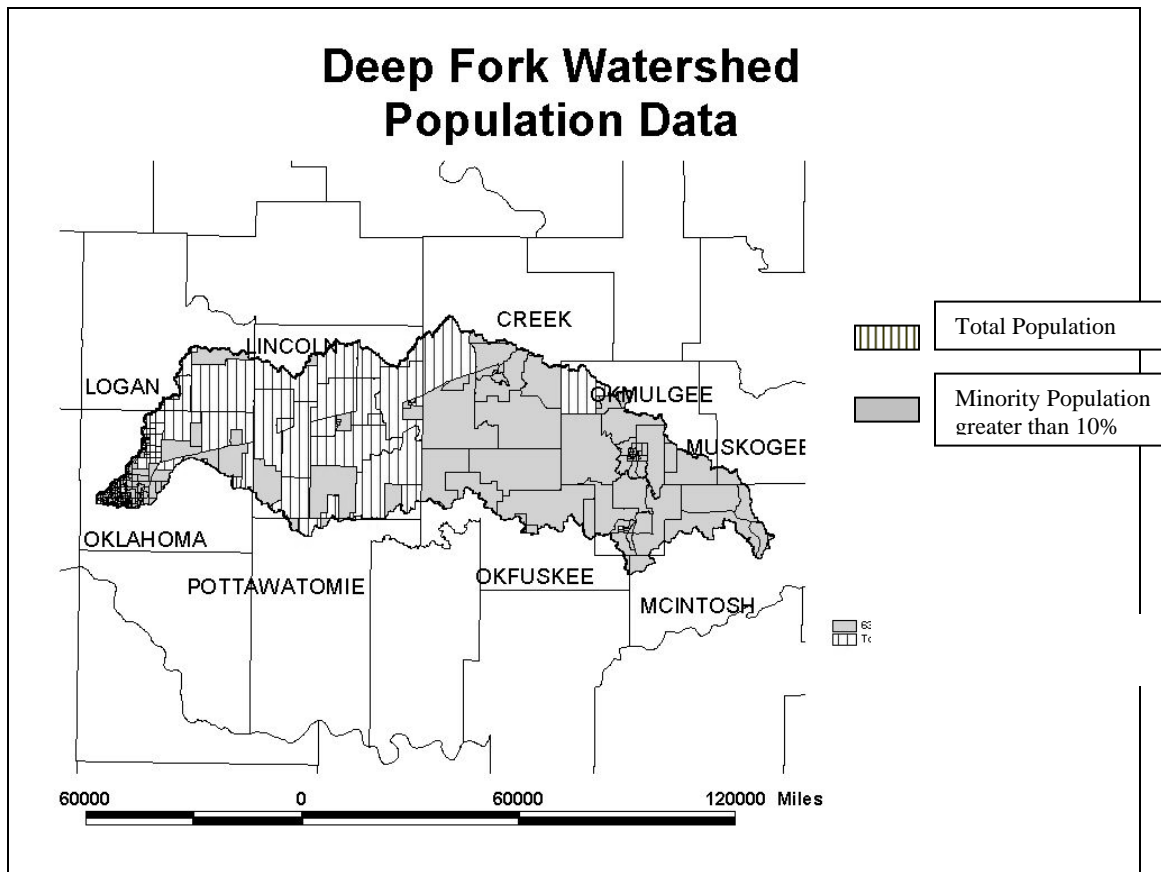


Figure 2. Population Data in Deep Fork Watershed

The Oklahoma Unified Watershed Assessment (Oklahoma Office of the Secretary of Environment, 1998) identified the Deep Fork watershed as needing preventive action to sustain water quality. Empowering communities to protect their own water is the best practice to insure sustainability.

Oklahoma State University together with Langston University conducted a pilot project funded by Cooperative State Research Education and Extension Service (CSREES) . The study found 38% of water samples from traditionally Black communities of Creek and Okfuskee counties, contaminated by coliform organisms, therefore, not meeting the Safe Drinking Water Act standard. The pilot further showed the need for special educational materials tailored to the learning style, educational level, and vision problems of this relatively uneducated, elderly audience. For example, many residents became frustrated when trying to read and understand the technical jargon on water analyses they received from the Department of Environmental Quality. Thus many analyses were discarded and no action was taken to clean up their water.

Using pictures of drainage areas and other visuals created by geographical information system (GIS) helps us teach about watersheds, aquifers, and risk factors. Maps and pictures produced by GIS can help show locations of rural water lines (sometimes an alternative to a poor quality well), aquifers and other water resources, as well as, available services such as United States Department of Agriculture (USDA) Rural Utility Services (RUS), and other offices.

Community-Based Organizations (CBOs) in this area are committed to improving water resources and providing educational opportunities. Cooperating in this project is *The Oklahoma Landowners and Tenants Association (TOLTA)* and the *Retired Educators for Youth Agricultural Programs (REYAP)*. Both of these CBOs have previously requested information on safe drinking water and best management practices to protect their drinking water and working with OSU to educate youth.

TOLTA is a 501 (c) (3) CBO who currently assists many federal agencies with outreach to landowners and to rural minority communities. TOLTA's mission is to define, address, and assist in the resolution of issues that affect the well being of under-served farmers throughout the state of Oklahoma. TOLTA hosts water quality meetings, identify landowners to implement best management practices and communicate issues addressing drinking water. Through this proposed project, the broad reach of TOLTA increases African American, Native American, and Hispanic participation in OSU's extension programs.

Retired Educators for Youth Agricultural Programs (REYAP) is a 501 (c) (3) CBO with a mission to increase the number of minority youth in agricultural programs by promoting opportunities in the field of agriculture. REYAP in collaboration with other agencies and universities sponsor youth internships in federal programs and encourage REYAP students from across the state to participate in FFA and 4-H programs. This organization recommends the youth in the target area for internships and volunteer programs addressing water quality issues within their communities.

Historically, churches in rural minority communities serve as the nucleus for community outreach. When the local churches approve functions and organizations, a synergy is generated among church members and the community that enhances acceptance and participation of community members. Churches in the target area are requesting water quality programs and educational information. Church leaders have expressed an interest of involving youth members to participate in programs addressing safe drinking water issues. Youth involvement affects the attitudes and behaviors of future adults.

This project draws on the expertise and experience of Oklahoma State University (OSU) to address the needs of these communities. OSU's water quality extension program serves every county in Oklahoma with resources and materials addressing drinking water quality. OSU's participation in the Southern Region Water Resources project, further expands the capability of this effort. The outcomes of the project will be measurable improvements in drinking water quality as well as increased understanding of factors that determine the quality of private and community drinking water supplies

Project Objective

The objective of this project is to educate citizens and leaders of rural minority communities to test and protect their drinking water supplies. Three goals identified in order to meet the objective are:

1. Increase awareness and understanding of well-water protection in targeted rural and urban minority communities.
2. Determine ongoing self-sustaining water information.
3. Develop ongoing community programs to ensure communities can address their water quality issues.

Methods

This project will accomplish three measurable goals to facilitate the objective, educating citizens and leaders of rural minority communities to test and protect their drinking water supplies.

Goal No. 1: Increase awareness and understanding of well-water protection in targeted rural and urban minority communities.

The **first** goal is to increase awareness and understanding of well-water protection in targeted rural and urban minority communities. OSU is developing a unique logo for cooperative water quality education involving Community Based Organizations and Oklahoma State University Cooperative Extension. OSU is also developing understandable and easily read educational materials targeted at an aging rural minority community. The materials will provide proactive action to protect drinking water through water testing to protect wells, to properly maintenance of septic tanks and household waste disposal. The materials will provide simple disinfecting procedures and other alternatives for safe drinking water. New educational materials will be developed and field-tested by members of the Oklahoma Landowners and Tenants Association before printing for widespread distribution. Input will be sought to increase community acceptance and insure the material meets community needs.

This program is conducted through community-based organizations, community centers, and churches. Local Community centers already provide services to senior citizens and social organizations. Churches serve as the social nucleus for most rural minority communities. Community-Based Organizations represent the community and can readily reveal local water quality concerns. Public meetings are held in churches and community centers because of high attendance that increases educational program visibility. Displaying data located within the communities help citizens visualize their involvement to protecting their drinking water.

Drinking water protection education will be conducted in Boley, Clearview, and Grayson. Residents are invited to bring water samples for nitrate, pH, and conductivity testing. For each meeting, Oklahoma State University and REYAP students test water samples with a nitrate, pH meter, and conductivity meter. The water samples are tested on site and the results reviewed and explained during the meeting. The Oklahoma Landowners and Tenants Association (TOLTA) and student interns support each meeting and provide outreach services.

Student interns from the REYAP organization use hand held global positioning systems to capture the location of assessments and water wells tested in this project. This information is being utilized as input to Geographical information system (GIS). The GIS procedure develops a pictorial and geographical view of areas. This will help incorporate extension educational activities into communities. Educational presentations tailored to local land use are the foundation upon which the project is built.

Outcomes from this objective provide simplified visuals of complex groundwater concepts available to residents and local officials. All educational materials is available at the local county extension office. The paraprofessionals and WQ educator can check out materials when visiting local sites and for demonstrations. The usage of this material is an indicator of its material effectiveness.

Material is simplified in pamphlets addressing disinfecting procedures and other alternatives for safe drinking water. The material has large type and space to address the elderly audience. Pictures are used in the material for easier understanding. Information addressing interpreting water analysis and disinfecting procedures have been added to the Oklahom*A*Syst workbooks. Six Oklahom*A*Syst, from Kizer and Brown (1998), meetings a year will be held in the target area. Reports show attendance, pictures, water test results, and updated database. A simple questionnaire is used to indicate the level of resident knowledge about private drinking water. Interns report the number of request for assessment assistance from each meeting. This will be used to measure action residents take to improve their drinking water.

Data collected from GPS units will be displayed at meeting locations and posted in local churches. Residents see their community involvement and participation level. Displaying community pictures generates enthusiasm and promotes local activity.

Okfuskee county extension office serves as a local facility. This is essential for team cooperation and program cohesion. Two county educators, water quality educator for the project, a paraprofessional, and two summer interns have a central facility. This also gives residents one location for referrals.

Goal No. 2: Sample water from wells and conduct well-site assessments in the target communities to assure that the residents have safe and sanitary drinking water.

The **second** goal for this project is to sample wells and conduct assessments in the target communities to determine the extent of water quality problems to ensure that the residents have safe and sanitary drinking water and insure that management practices in urban areas are not contributing to polluting the waters.

One paraprofessional, Water quality educator, and two summer interns are from the local communities for this project. This team is stationed at the County Extension Offices in cooperation with the County Extension Educator. The team becomes an integral part of community-based professionals, making personal visits to sample home water wells for (coliform bacteria) and conducting inventories and assessments. The Oklahoma Department of Environmental Quality analyzes water samples for bacteria content.

The paraprofessional returns written report to participants and explain results directly on a one-on-one basis. If follow-up treatment is needed, the paraprofessionals will arrange follow-up by appropriate project staff and cooperating agencies such as, OSU extension or DEQ. Where problems are found, well users are educated about the problem and remedial actions suggested. Actions such as chlorinating water and re-testing are likely. The intern, paraprofessional, and county educator provide an inventory of upstream items with a potential for contributing to nonpoint source pollution. Simple easy to read pamphlets are distributed with alternative methods of obtaining safe drinking water. These methods include but are not limited to purchasing bottled water, installing automated chlorine systems, and using reverse osmosis systems to obtain safe drinking water.

The water quality educator assists OSU county educators to establish water quality active groups, such as Blue Thumb, from the youth in the target communities. Drinking water quality and educational activities are made available to this group. Calculating drinking water risk using the Oklahom*A*Syst program and using geographical positioning units (GPS) as well as other water quality activities increases the water quality awareness of the youth. The youth participate with collecting and documenting data for the project. This program familiarizes best management practices to the youth, our future, for sustaining the environment.

The outcome of accomplishing this goal will be a well informed water educator with water quality expertise. The community will sustain a local paraprofessional in the community with drinking water expertise, and two interns in the community with a working knowledge of drinking water and GPS analysis. The community will have an increased knowledge of management practices to protect their drinking water. The project will generate 300 samples tested by DEQ for bacteria and 300 assessments completed with the results entered into a database. This database will contain geographical data, water analysis, location, and surrounding potential contaminant sources. The database can be used for future resources to research and sustaining programs.

Goal No. 3: Develop programs to ensure sustainability for communities to address water quality issues.

Goal **three** is to develop programs to ensure sustainability for communities to address water quality issues. Blue Thumb is a national water quality monitoring program. It is implemented through public schools, 4-H organizations, Boy Scout programs, and other volunteer programs. OSU extension county educators will be working with volunteer groups such as TOLTA, REYAP, 4-H, and church groups, to develop a Blue Thumb program in this target area. Likewise, churches will establish programs to have water tested periodically in their community.

Conclusion

Three hundred water samples for this project will be submitted to ODEQ and tested for bacteria. Through personal contact, 500 Oklahom*A*Syst risk assessments will be completed and documented. Volunteer efforts to correct problems identified from assessments will be

documented. A database establishes a baseline of the drinking water results and will be used for future educational efforts.

Student interns and paraprofessional will conduct an initial follow-up each summer to determine if residents have had water tested and if a problem identified from a previous assessment has been corrected. TOLTA and REYAP will submit an evaluation of the educational material, meetings, and information they receive resulting from the project. The organizations will also be asked for a report of knowledge gained from the project.

The water quality educator and the paraprofessional are given continuous updates and educational opportunities addressing drinking water. Evaluations are completed following each educational component to address their expertise level. In addition the students will be given a test following their internship to directly measure their level of drinking water knowledge from the program.

The final drinking water project in under-served communities will leave understandable educational material, expertise on ground water and drinking water, increase knowledge of protecting drinking water, and develop a sustainable community drinking water program.

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