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Assessing ground water sources in underserved communities.

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The protection of surface and groundwater continues to pose a major challenge; since it impacts source and drinking water quality. Contamination of water sources knows no economic or ethnic boundaries. Some underserved communities have limited resources to upgrade community water supplies, handle storm water discharges and provide for a good wellhead protection and disinfection. Our goal is to enhance the safety of drinking water sources and sustain the agricultural viability in rural communities especially in the state of Tennessee. We believe this can only be achieved through multidisciplinary integrated research, education and extension approach. The proposed studies will focus on well water monitoring while using a novel approach to understand problems associated with improper well maintenance and construction. We hypothesize that most wells in underserved communities lack proper well head protection and subsequently are vulnerable to non-point source contamination from fertilizer nutrients, pesticides, sediments, coliform bacteria and in some instances E coli. The objectives of this proposed project are: (1) monitor wells in underserved rural communities for nitrate-nitrogen, dissolved oxygen, total dissolved solids, turbidity, temperature and pH; (2) use down- well camera to capture footage of problems associated with improper well constructions and maintenance; (3) educate farmers and homeowners in these communities on pollution prevention and protection of drinking water sources; (4) strengthen TSU's students involvement in research and outreach activities in the environmental area. The plan of operation includes: (1) use state-of- the art equipments and sensors to analyze the water chemistry including nitrate-N of selected wells; (2) use a down well camera to identify water quality problems due to poor well construction; (3) develop periodic news letters and educational video to serve as educational tools with focus on water quality and proper well construction techniques

and (4) employ TSU's Students as work-aide, to gain experiential learning from the project. Anticipated outcomes of the project include: (a) building research and extension capacity in water quality at TSU; (b) provide an opportunity for communities to interact with a network of water quality specialists and to develop strategies for addressing critical water resource issues through research, education and extension activities; (c) provide valuable extension and research experience and interaction with project scientists and students; (d) better trained students especially in the environmental area, this will contribute to a well-prepared undergraduate students' pool and (e) private well owners may drive changes to well construction techniques by demanding practices that reduce or prevent common problems such as grouting the entire well casing rather than the top ten feet. Scientifically, it is expected that the project approach will replace conjecture with visual facts and recognize problems that Research and Extension programs should be addressing in water resource arena. Environmentally, groundwater can be protected; thus eliminating path ways for contaminants to migrate to groundwater resources. Economically, abatement of groundwater contamination is essential because once contaminated it is usually more expensive or impossible to clean up.