Mobile computing technologies to enable more efficient and in-field water management decisions

Dennis Buckmaster, A. Ault, Indrajeet Chaubey, Jane Frankenberger, J. Krogmeier

This project will address the following priorities:
• developing water decision-making tools and technologies for consumers
• developing and piloting electronic technology on handheld devices for improved water management.

There currently exists a serious time lag within the process of conservation practice evaluation and design due to the excruciatingly iterative logistics of field visits to discuss options with farmers and landowners followed by later synthesis and evaluation of data on an office computer with other references and resources available. This is generally repeated as options are discussed and refined. The time lag of waiting on access to a computer within each iteration acts as a very real, very significant hurdle to the widespread adoption of many conservation practices.

We propose to address this inefficiency by developing, testing, and disseminating mobile applications ("apps") through a new open-source Water Management App Center (WMAC). The WMAC will provide a centralized location for field representatives and other stakeholders to find useful apps as well as provide an open conduit for all future developers of water quality-based apps to reach their intended audience. The initial proposed mobile applications will provide information about watersheds including catchment area, soil, and land management; determine BMP feasibility; estimate baseline water quality; and estimate improvements due to installation of potential practices. As a result, these apps and those they inspire will shorten the BMP design cycle and decision process, resulting in more efficient management of agricultural watersheds and enhanced understanding by stakeholders of processes affecting water quality and choice of conservation practices in agricultural watersheds.

The project objectives are to:
1. Develop in-field mobile applications for watershed delineation, field characterization, watershed characterization, water quality evaluation, and BMP evaluation.
2. Evaluate the in-field water quality mobile applications to assure these deliverables meet priority needs and are user-centered with effective interfaces and required accuracy.
3. Disseminate these mobile water quality applications to a wide audience of technical service providers, field agents, researchers, students, and soil and water agency professionals through a new open-source Water Management App Center.

A crucial feature of this proposal is that all apps and their interfaces will be relentlessly user-focused through continued engagement with various conservation field representatives, agricultural consultants, farm advisors, and technical service providers to ensure that the developed applications address real problems they routinely face. We will form an advisory board to provide counsel during development and pilot testing. Pilot testing in agriculture and engineering courses will also provide both dissemination and evaluation functions. As the project nears completion, a widespread dissemination plan including workshops, webinars, published lab exercises, and open-source access to the project software will be implemented.