



WATER RESOURCES RESEARCH GRANT PROPOSAL

TITLE: Economics of Using On-Farm Reservoirs to Distribute Diverted Surface Water to Depleted Ground Water Areas of the Southern Mississippi Valley Region

FOCUS CATEGORIES: SW, ECON, MOD

DESCRIPTORS: Diverted surface water, reservoir distribution, irrigation value, management

DURATION : 3/1/99 - 2/28/00

FEDERAL FUNDS: Total Direct Indirect \$20,543 \$20,543 \$0

NON-FEDERAL FUNDS: Total Direct Indirect \$41,695 \$24,787 \$16,908

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CONGRESSIONAL DISTRICT: Arkansas - District 2, 3 & 4

STATEMENT OF CRITICAL STATE/REGIONAL WATER PROBLEMS

Rapid ground water depletion is becoming a significant problem for parts of the Southern Mississippi River Valley. Six eastern Arkansas counties were declared critical in 1997 by the Arkansas Soil and Water Conservation Commission (ASWCC) with the major problem centered in the Grand Prairie area. A proposed solution to the ground water depletion problem under investigation by water agencies is to divert surplus winter and early spring flows from the White River by a canal system to the farmer stakeholders.

To make the system work, on-farm reservoirs will be needed along with a canal distribution system to store and manage the diverted surface water for crop irrigation use during the growing season. Since this proposed project will require considerable public funding as well as financial commitment by the farmer stakeholders it is important that the distribution be cost effective for the public interest and affordable for the stakeholders.

STATEMENT OF RESULTS OR BENEFITS

Irrigation systems of representative farms in the critical ground water areas will be modeled to estimate the value of water supplied for irrigation from various sources

including: captured on-farm rainfall runoff, available groundwater wells, tail water recovery and diverted surface water. Use of on-farm reservoirs in conjunction with wells and available inflows of diverted surface water will be evaluated during the crop growing season to estimate the value of the diverted water as a supplement to the other water sources. Results of this study will identify the optimal on-farm reservoir system which utilizes diverted surface water for different farm situations as well as the economic benefits of supplying the diverted surface water to farms.

NATURE, SCOPE, AND OBJECTIVES OF THIS RESEARCH

The project will evaluate representative farm irrigation systems with common crop rotations in depleting ground water areas to evaluate the benefits of irrigation from alternative water sources including diverted surface water. Irrigation benefits of the individual farms will be estimated under variable weather and price conditions with and without access to diverted surface water over a 30-year period with projected changes in ground water supplies. On-farm reservoirs will be evaluated in the irrigation system as a water conservation practice to collect rainfall runoff, recycle tail water and complement the available ground water supply as well as serving as a possible distribution method for diverted surface water over the project 30-year period.

Specific research objectives are:

- 1) To estimate the optimal use of available water sources for irrigation utilizing on-farm reservoirs under different ground water resource situations for a 30-year period.
- 2) To identify the optimal use of on-farm reservoirs with and without access to supplemental diverted surface water over a 30-year period.
- 3) To estimate the economic benefits of diverted surface water for different farm situations and water supply conditions over a 30-year period.