Grand Prairie Area Demonstration Project

Recently, a paper was provided to the Grand Prairie On-Farm Environmental Team. This paper included an alternative to the Grand Prairie Area Demonstration Project called the Grand Prairie Alternative (GPA). It stated that this proposal was presented at a TWS meeting on February 7, 2001. It also included a mobilization strategy as quoted below.

> "Given that the crucial Congressional Appropriations cycle is rapidly approaching, there may be insufficient time to become immersed in a GPA feasibility analysis that strives for a 100% level of certainty. Rather, it might be more important to quickly join forces with agricultural opponents of the GPADP with a moderately well researched GPA and attempt to cast a reasonable doubt over Congress' consideration of the $319 million GPADP appropriation. This potentially could fir in with the new administration's desire to reduce government spending. It also might be a good idea to develop the GPA behind the scenes and seek an influential local farmer – or group of producers – to take credit for the proposal and sell it to others in the community, particularly if they have any links to the Governor's Water Task Force."

This GPA proposal claimed to be able to develop surface water supplies sufficient to irrigate 75% (180,000 acres) of the cropland in the Grand Prairie project area by increasing irrigation efficiency to 80% and increasing storage. The proposal also said that the farmers would be paid to retire that land unable to be irrigated and get paid for the land converted to reservoirs.

The information presented in this proposal was considered by the Corps and the NRCS. Studies conducted by the Natural Resources Conservation Service and others have indicated that getting 80% irrigation efficiency over a large area is just not possible. Getting 80% on an individual farm may be possible, but it is not possible over a large area. Even with 80% efficiency and additional storage, irrigated agriculture could not be continued on 180,000 acres. Analyses indicate that the with an increase to 80% efficiency but without a source of additional water, water would be available for only 72,900 acres. Approximately 18,300 additional acres could be irrigated over the 54,600 in the future without project conditions. This mean that even with an increase to 80% efficiency, water would not be available to continue irrigation on 70% of the land currently irrigated with disastrous effects to the regional and national economy.

From a practical standpoint, this winter (2001) is the first time in the last 3 years that many farmers have reported being able to fill their existing reservoirs. The Grand Prairie Area Demonstration Project will more than double the recoverable storage in the project area filling these reservoirs first from rainfall. Studies have been conduced on the amount of rainfall that could be captured. Increasing reservoirs without a source of water to fill them in most years will spread the existing water over more surface acres and increase evaporation.

It should be noted that contour levee irrigation is modified form of border irrigation and is slightly less efficient due in large part to the varying sizes of the "paddies".

From "United States Department of Agriculture, Natural Resources Conservation Service, National Engineering Handbook, Part 652, Irrigation Guide"

Section 652.0904(b) Irrigation efficiency definitions

"Irrigation efficiencies are a measure of how well an irrigation system works as well as the **level of management** of the system."

(7) Potential or design application efficiencies

"Potential or design application efficiencies are usually those recommended in the irrigation guide and in various tables and charts in NEH, Part 623, (Section 15) Irrigation. These efficiencies are typically used for designing irrigation systems. The efficiency recommendations usually assume **good management** and maintenance of a well designed and installed system." ... "Judgement by the designer is required. Overestimating the operators level of management can result in an inadequate irrigation system design."

SUMMARY

On February 7, 2001, a paper entitled "A Central Valley of California Perspective on the Grand Prairie Area Demonstration Project and Ideas that Could be Incorporated into a Grand Prairie Alternative" was presented at a TWS meeting by Mr. Dave Smith. In this paper Mr. Smith touts the need to "achieve 80% irrigation efficiency".

The credentials in the field of irrigation of these individuals making these claims are not presented. The NRCS employees utilized to assist in the planning, design, and development of the Grand Prairie Area Demonstration Project plan are experts in the fields of irrigation and/or engineering. Those making the claims appear to be "**only casually acquainted with irrigated agriculture**" as stated in paragraph 1 above and have little if any knowledge related to the requirements to meet an average of "80% irrigation efficiency" for the entire project area. However, documentation of information for public and NRCS review would be considered.

The NRCS agrees that we should "strive to attain greater than 80% efficiency". However, to claim that an average 80% irrigation efficiency can be accomplished over the entire project area would be irresponsible and would likely bring questions about the economic viability of the project if the economic analysis were based on this figure.

In order to achieve an 80% average irrigation efficiency on a **single** field, an 80% average irrigation efficiency must be accomplished for every irrigation (as many as 6 per year for soybeans), for every year, for the life of the project (50 years). Projected to the farm level, every field must maintain this average for every year, for the life of the project. Projected to the project level, every farm must maintain this average for every year, for the life of the project.

Anyone with experience in handling more than a single task at a time, will realize this is a very admiral goal, but not likely to be achieved.

NRCS has utilized an abundance of information, data, studies, expertise, experience and professional judgement in order to develop the on-farm portion of the Grand Prairie Area Demonstration Project plan. We stand by this information as our best estimate of achievable results and will gladly review this information with anyone willing to spend the time necessary to understand the processes utilized in the development of this plan.

The debate on 70% vs 80% average irrigation efficiency for the Grand Prairie Project.

Irrigation Efficiency is the ratio of the average depth of irrigation water beneficially used to the average depth applied, expressed as a percentage.

While the concept of Irrigation Efficiency seems simple and straight forward, the actual application of this term to field practice is very complicated and difficult to understand. Irrigation Efficiency is directly related to a myriad of variables which must be considered when deciding when and how much to irrigate. Some of the factors influencing irrigation efficiency include field slope, field size, soil type, soil texture, slope variability, paddy size, furrow length, flow rate, water source availability (timing), water source amount, infiltration rates, deep percolation rates, rainfall, evaporation rates, temperature, existing soil moisture, available water holding capacity of the soil, traffic pans, irrigation application methods, and probably most important of all, management practices.

From "Design and Operation of Farm Irrigation Systems" an ASAE Monograph Number 3 in a series published by American Society of Agricultural Engineers, September 1983

"One of the most important terms that is used extensively by irrigation specialists in designing and operating irrigation projects is irrigation efficiency. However, the same term is not well understood by many policy makers and others **only casually acquainted with irrigated agriculture.**" ...
"Undoubtedly, many irrigated projects could reduce the net consumption of water by substantial improvements in the distribution and on-farm systems, but the savings in water generally will not be proportional to the changes in irrigation efficiency as is often erroneously assumed. This is a very common misconception that is expressed by the general public when evaluating or considering the use of water for crop production."

An interagency task force report (ITFR, 1979) indicated that "If all measures in the Soil Conservation Service survey were implemented under a 25-yr accelerated program, it is estimated that conveyance efficiency could be increased 10 percent, and on-farm efficiencies 13 percent."

NRCS has estimated an average 10% improvement in on-farm irrigation efficiencies as a result of installing conservation practices in the Grand Prairie Project Area.

From "United States Department of Agriculture, Soil Conservation Service, National Engineering Handbook, Section 15, Irrigation, Chapter 4, Border Irrigation"

Success in designing an irrigation system depends on the ability of the designer to make a reasonable estimate of the efficiency that can be achieved on a particular site under a given set of management conditions. In most cases, the principal hazard is overestimating efficiency, which leads to designing an irrigation system which cannot achieve adequate irrigation at the efficiency that can actually be obtained. "In all irrigation methods, efficiency is affected more by the **management practices** of the irrigator than by any other factor."

"On gently sloping well-leveled fields, if adequate facilities for the control and distribution of water are installed **and good irrigation management practices are followed**, a field efficiency of 60 to 75 percent usually is feasible."

Table 4-12 lists "Suggested design efficiency for graded border irrigation by slope and intake family." The values range from 50% to 80% with 15 instances of 80% recommended as a "field design" efficiency out of approximately 350 instances listed in the table.

Summary of primary objectives of the "California" plan. No documentation was offered to support the plan, the ability to implement the plan, or its results.

- Prevent water diversions from the White River
- Prevent the establishment of a comprehensive water distribution system that could easily be modified, at a later date, into a system capable of diverting water from the White River
- Develop surface water supplies sufficient to irrigate 75% (180,000 acres) of the cropland in the Grand Prairie project area ***This is not possible***
- Enhancement of existing water storage reservoirs ***This is included in the authorized project***
- Construction of new water storage reservoirs ***This is included in the authorized project***
- Water conservation measures (tailwater recovery, pipelines, applications systems) ***This is included in the authorized project***
- Retire cropland through mechanisms *more lucrative* to farmers than the continued cropping of soybeans and other lower value cash crops ***There is currently no mechanism available to get Federal funds to do this***
- WRP (Special Project $ appropriated and not subject to competitive ranking), combined with the additional lease of waterfowl hunting rights of sale of WRP land for a duck club ***Most of the Grand Prairie is not wetlands, without rice farming there would be many fewer ducks on the Grand Prairie. There is currently no mechanism available to get Federal funds to do this***
- Irrigation storage reservoirs with land use payment (75-100% of land value for loss of cropping potential + 75-100% cost-sharing) ***There is currently no mechanism available to get Federal funds to do this***
- Gain the support of members of the agricultural community that may have been 'on the fence" with respect to the GPADP

The majority of the Grand Prairie is not wetlands, it was a prairie. It is not likely the land payments program proposed would ever be funded to such an extend over such a relatively limited area when the WRP program is targeted to wetlands.

The paper implies that the Grand Prairie will not save the aquifers. Two fresh water aquifers underlay the Grand Prairie, the Mississippi Valley Alluvial Aquifer and the Sparta Aquifer. As the alluvial is depleted, irrigators are turning to the Sparta witch also furnishes the drinking water and water for industry. This resource does not have the water carrying or recharge capacity of the alluvial and will be depleted by agricultural use. It also is more susceptible to permanent compaction and salt water intrusion from the salt-water aquifers located underneath as its water level and water pressure drops. The Grand Prairie Area Demonstration Project does not use any water from the Sparta aquifer for irrigation. The water from the Sparta is also much more expensive. The project would still use the alluvial aquifer at its long-term safe yield, the water that could be pumped after the aquifer is essentially depleted. This number is significantly less than the current recharge rate for the project. The project has a water shortfall on an average annual basis, but even if the short fall is met from the alluvial aquifer, its current recharge rate is greater than the safe yield plus the unmet need. This assumes that the project is built before the aquifer is depleted.

The stated purpose of this proposal is to "cast a reasonable doubt" over the Congressional appropriation for the Grand Prairie Area Demonstration Project. The paper stated that a feasibility level study will not be done. Even if the people developing it were serious about implementation and a means was found to implement it, this GPA proposal would not realize the benefits claimed. The Grand Prairie Area Demonstration Project has had years of serious study and has just completed a review of the water sources for the project. Environmental agencies were involved in the studies, and all environmental reviews have been completed for compliance with the National Environmental Policy Act. Studies have indicated that no significant impacts to the White River would occur. The project was planned allocating water to the needs of fish and wildlife, water quality, and navigation before any water diversion would occur. The project will protect both the Sparta and Mississippi Valley Alluvial Aquifers and will provide the water necessary to continue irrigated agriculture in the Grand Prairie.