

## TR-98

### The Impact of Energy Shortage and Cost on Irrigation for the High Plains and Trans Pecos Regions of Texas

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The High Plains and Trans Pecos regions of Texas are semi-arid crop production regions located in the western part of the state. Relatively low levels of rainfall are supplemented by irrigation from groundwater supplies. These regions produced 51 percent of the cotton, 42 percent of the grain sorghum, and 48 percent of the wheat produced in Texas in 1974 (Texas Crop and Livestock Reporting Service). Considering only irrigated production these percentages were 75, 85, and 91 percent of Texas irrigated crop production for cotton, grain sorghum and wheat respectively. The importance of the High Plains and Trans Pecos regions to Texas crop production are not limited to these three crops, however, these statistics do serve to illustrate the significance of these regions in the Texas agricultural economy.

While it is easily seen that the majority of irrigated production (for the crops mentioned) in Texas occurs in these regions, it should be noted that the importance of irrigation in the High Plains and Trans Pecos regional economies is much greater than these statistics show. On the High Plains 86 percent of the cotton, 90 percent of the grain sorghum, and 75 percent of the wheat produced in 1974 was harvested from irrigated acreage. Rainfall is somewhat less in the Trans Pecos region and 100 percent of the production of these crops was under irrigation (Texas Crop and Livestock Reporting Service). More than 60 percent of the value of agricultural crops in Texas is produced on irrigated land (Knutson, et.al.). Thus, the crop production of these regions is vitally important to the Texas and respective regional economies. Crop yields are heavily dependent on groundwater irrigation and extremely sensitive to any factor which may affect the availability or cost of irrigation water.

Availability and price of fuel used in pumping groundwater are the critical factors which directly affect the availability and cost of irrigation water. About 39 percent of the energy used in Texas agriculture in 1973 was utilized in pumping

water, compared to 18 percent used in machinery operations. Of this irrigation fuel, 76 percent was natural gas, the majority of which was consumed in the High Plains (Coble and LePori). Current supplies and reserves of natural gas have reached critically low levels in recent years and producers in the High Plains and Trans Pecos regions are faced with possible curtailments of, and certain price increases for their irrigation fuel (Patton and Lacewell).

The threat of possible curtailment of fuel supplies during the irrigation season imposes greatly increased risk to irrigated crop production since curtailment of natural gas supplies during a critical water use period would significantly reduce yields (Lacewell). This threat would also increase financial risk and restrict availability of credit.

Continued price increases for natural gas will increase costs of pumping irrigation water and hence the costs of irrigated crop production (Patton and Lacewell). The Ogallala aquifer underlying the High Plains and many of the alluvium aquifers underlying the Trans Pecos are exhaustible; i.e., there is a negligible recharge from percolation and other sources. Therefore, even with unchanged natural gas prices, these groundwater supplies are being "economically" exhausted over time as pumping depth increases. Increases in fuel prices will lead to reduced groundwater pumpage and result in less groundwater being economically recoverable. Although life of the physical supply will be exhausted, a greater quantity of groundwater will be economically unrecoverable for irrigation without significant product price increases.

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
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