



Texas Precision Agriculture

The Texas A&M University System – Agriculture Program

Annual Reports – 2000

Principal Investigator: W. L. Harman, Agricultural Economist
Texas Agricultural Experiment Station
Blackland Research Center, 808 E. Blackland Road
Temple, TX 76502;
(254) 770-6656; Email: harman@brc.tamus.edu

Cooperators: Temple – J. R. Williams and E. Wang
Amarillo - S. Amosson, T. H. Marek, and B. Bean

Primary Research Locations: North Plains Research Field (NPRF), Etter, TX
Blackland Research Center, Temple, TX

Project Title: Environmental and Economic Tradeoffs of Precision Farming:
A Research Investigation in Irrigated Agriculture, Northern
Texas Panhandle

Reporting Period: September 1, 1999 to August 31, 2000

Objectives:

1. Using experimental water quality analyses and crop yields by soil water holding capacity (depth), validate APEX for irrigated corn yields, and NO₃-N,P, and sediment in irrigation runoff losses.
2. After characterizing the experimental field at the NPRF, compare the field average corn yield using VRT inputs by soil depths with the average field yield using uniform applications.
3. To estimate the long-term probabilities of NO₃-N losses exceeding safe drinking water standards and soil erosion using VRT technology vs. uniform applications of inputs.
4. To estimate the economics of precision agriculture.

A. Summary of Progress:

The 2000 corn year was a hot, dry year resulting in most VRT-nitrogen treatments receiving substantially less than 1.0 PET irrigation applications. Nevertheless, irrigated corn yields were obtained from all treatments but no irrigation runoff samples were

taken during the growing season. 1998-00 average yields with low N fertilizer of 120#/ac and shallow soil (less than 30") were 161.2 bu/ac while the medium soil depth of 31 to 48" with medium N of 180 #/ac averaged 13 bu/ac less or 148.4 bu/ac.

The highest N rate of 240#/ac with a deep soil of over 48" yielded 155.9 bu/ac during the 1998-00. Average 1998-00 yields of 150.5 bu/ac and 170.3 bu/ac using a uniform rate of 240#/ac on the medium and shallow depth soils respectively were 2 to 9 bu/ac higher than the yields using reduced VRT-N rates.

B. Education/technology transfer: NPRF Field Day

C. Milestones achieved:

D. Publications:

E. Precision agriculture proposals: USDA-IFAFS "Present and Future Adoption of Precision Farming Technologies in the South."

F. Precision Agriculture meetings attended/papers (posters) presented: Presented 1998-99 water quality results and GIS soil depth and initial nitrogen maps of the 1998 NPRF research site to the W-190 western irrigated regional research group.

G. Other Developments: A decision to reduce mid-project funding by 60% for completing objectives #1 and #3 in FY01 will limit the work plan significantly from that previously submitted.