

## UTILIZATION OF REMOTELY SENSED DATA FOR MANAGING LAND-FORMING FIELDS IN THE S.M.A.R.T. PROGRAM

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**ABSTRACT:** Ground-truth data collection included; soil chemical and physical properties, tissue samples, hand-held spectroradiometer, percent ground cover, and soybean physiological measurements. This data will be compared to hyperspectral and multispectral data to determine if remotely sensed data can be used to detect factors that affect spatial variability in soybean production. This data will also be used to determine the validity of land forming in the hill region of Mississippi for soybean production.

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**KEYWORDS:** Hyperspectral, multispectral, remote sensing, soybean, spatial variability.

**MATERIALS AND METHODS:** Remotely sensed and ground-truth data were collected in two soybean fields near Houlka, MS, to elucidate land-forming effects on crop production by evaluating the spectral response of relationships between soil properties and yield. The two fields were grid sampled at 0.25 acres prior to planting. Soil samples (0-6 in) were collected from a land-formed and a non-formed field. Mississippi State University Soil Testing and Plant Analysis Laboratory analyzed soil samples for chemical and physical properties. Production practices at both sites included; double cut field cultivation, 200 lb/ac of 0-23-30 fertilizer, do-all and plant. The seeding rate in both fields was 55 lb/ac of Pioneer 95B53 in 10-inch row spacing. Planting dates for the two fields were May 25 for the land-formed field and May 23 for the non-formed field. Glyphosate at 1 lb ai/ac was applied on June 14 and July 7 for weed control in both fields. Plant height, growth stage, canopy cover, weed cover by species, and tissue samples were collected for each field on August 1, August 8, and September 9. Soil compaction measurements using a digital cone penetrometer were taken to an 18 in depth at 2 in increments on July 7, July 17, and September 9. An estimate of leaf chlorophyll level was taken on July 17, August 8, August 10, August 17 and September 9 via spectral leaf absorbency, using a Minolta SPAD meter. Volumetric soil water content was measured using a TDR 300 soil moisture probe to an 8 in depth on July 17, August 17 and September 12. A yield monitor equipped combine was used to harvest the non-formed field on October 4 and land-formed field on October 5. After harvest, a 1.75 in tube mounted Giddings probe was used to collect soil core samples on a 0.5 ac grid for horizon nomenclature, horizon depth, texture, structure, and series designation. Hyperspectral reflectance measurements were collected at each site with a hand-held FieldSpec Pro FR portable spectroradiometer to determine which wavelengths best distinguish biophysical processes of the soybean plant. Hyperspectral measurements were taken on July 10, July 17, August 28 and September 10. Acquisition of multispectral data was collected using an aerial platform at various times throughout the growing season.

**RESULTS AND DISCUSSION:** All data has been collected for the 2001 growing season. Image georectification, data management, and statistical analyses are currently being conducted. A complete report will follow in 2002.

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