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THE EFFECT OF THE LANDSAT CLOUD COVER DOMAIN ON WINTER WHEAT ACREAGE ESTIMATION IN KANSAS DURING 1976

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A preliminary analysis was done to determine the effect of a cloud cover domain on winter wheat acreage estimation utilizing LANDSAT data in Kansas during 1976. The objective of the analysis was to see the effect of domain estimation in arriving at unbiased estimates of wheat acreage. Thus, the extent and location of cloud cover on LANDSAT imagery in relation to wheat acreage recorded on SRS ground surveys was examined.

For the state of Kansas in 1976, two mosaics were constructed. Both mosaics were constructed using the best quality and most cloud free imagery from the entire months of April and May in 1976. The first mosaic uses only LANDSAT-1 imagery and the second mosaic uses only LANDSAT-II imagery. SRS sample segments were manually located on the imagery. Each segment was classified as cloud covered or cloud free. Segments that were partially cloud covered or in cloud shadows were classified into the cloud covered domain.

A composite of the best imagery from both satellites was constructed algebraically. The intersection of the segments that were cloud covered on LANDSAT-I and LANDSAT-II was used to define the cloud cover domain for a composite of LANDSAT-I and II.

Significant differences were found for average wheat acres per segment using ground survey data in the two domains (cloud covered vs. cloud free) for LANDSAT-I, LANDSAT-II, and the composite of LANDSAT-I and II. Two types of estimates were made for each of LANDSAT-I, LANDSAT-II and the composite of LANDSAT-I and II. The first estimate uses only cloud free segment data and the second estimate uses all segment data. The ratio of the cloud free segment estimate to the all segment estimate for LANDSAT-I, LANDSAT-II, and the LANDSAT-I and II are respectively 0.845, 0.927, and 0.929.

The conclusion of the author, based upon a random sample of area segments for which wheat acreage was acquired by ground enumeration for the cloud covered and cloud

free domains, is that biased estimates would have resulted if data for both were not available. This analysis would indicate that effects of cloud cover must be adjusted for, using auxiliary data, if unbiased estimates are to be obtained when clouds are present.