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# ASSESSMENT OF CROP CONDITIONS IN SOME CEREAL GROWING REGIONS OF RUSSIA AND THE UNITED STATES USING LANDSAT DATA

P. CHAGARLAMUDI

F.G. Bercha and Associates Limited  
Ottawa, Canada

A. R. MACK

Agriculture Canada/Research Branch  
Ottawa, Canada

## SUMMARY

Crop conditions were assessed using Landsat data in three cereal producing regions of the United States (U.S.) and the Soviet Union (USSR). The assessed conditions in the spring and fall planted wheat growing areas were presented as coded maps showing the spatial distribution of growing conditions.

A system was developed previously in Canada for estimating conditions of spring wheat in Canada and of winter wheat in the U.S. utilizing Landsat digital data. In this system, classes of green vegetative canopy densities derived from Landsat, were related to field observed parameters of growing conditions of spring and winter wheat. The computed densities in several test sites expressed as a biomass index, were used in developing crop condition models to express growing conditions as composite wheat yields for a crop district or a county.

Based upon concepts established in the above mentioned Canadian studies, growing condition codes derived from the biomass index of a sample area were employed in models utilized in the present study. The models proposed for both the spring and the fall planted wheat crop were similar to those developed previously from the biomass indices derived for small test sites. The spring planted wheat model was used in one study area - the Omsk area of the USSR; the fall planted wheat model was used in two study areas - the Kharkov area of the USSR and Saline area of the U.S. For the USSR study areas, Landsat data from only three production years between 1974 and 1979 were available to this investigation.

Crop conditions estimated from Landsat data were expressed as wheat yields in all the three study areas using the proposed models. The estimated crop conditions in the USSR crop regions were compared to wheat yield estimates made from meteorological data. In the U.S. study area, the estimated crop conditions were compared to the reported yield data for counties and crop reporting districts in Kansas by the U.S. Department of Agriculture.

Crop conditions expressed as wheat yields in all the three study areas, compare very favourably to the reported conditions. In both the Omsk and the Kharkov areas, the conditions estimates were, on the average, within five percent of the yield values reported for the corresponding crop regions. In the Saline area, which includes nine counties from two crop districts, the estimates for all the counties were within ten percent of the reported values; while the two crop district estimates were within three percent.

Since the data utilized in this study for establishing the models for the Soviet Union were limited, it is cautioned that the models should be used only for estimating changes in crop conditions rather than as an absolute measure. Further, it is recommended that the models proposed for the Soviet Union should be refined utilizing data from additional crop years and/or crop regions.