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CLOUDY WITH A CHANCE OF ...CROP CUTTING - SHORING-UP REMOTE SENSING ESTIMATES

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ABSTRACT: Remote mapping of evapotranspiration provides estimates of actual evapotranspiration, which in most agricultural areas of the western United States is less than potential evapotranspiration. Therefore, remote sensing methods are both desirable and necessary in areas where water supply information is not available. The input data for remote sensing of ET is provided from two sources, satellite imagery and on-the-ground climate data. Equipment for the ground climate data can continuously monitor radiation; whereas the satellite imagery is only available as an instantaneous 'picture' of the ground at regular intervals. Ground climate data can be used to estimate potential evapotranspiration between satellite images and interpolate estimates when cloud cover results in an incomplete image. Interpolation accuracy, especially if cloud cover requires a longer interpolation period, can be compounded if cutting or harvesting of crops occurs or supply is reduced between satellite pictures. In a project sponsored by NASA, the METRIC method was used to investigate the feasibility and accuracy of estimating crop ET for the South Platte River basin in Colorado. The method was compared to traditional 'actual' consumptive use methods that couple monthly and daily ET calculations with water available to the crops. During the comparison, the use of available surface and ground water diversion records was investigated to assist with interpolation between satellite pictures. In many western U.S. basins, diversions are continuously measured and readily available for at least some of the ditch systems. These measurements of water supply can provide valuable information to shore-up instantaneous satellite estimates. For example, an approach that assumes similar water availability from one picture to the next could over- or under-estimate crop use if available water changes significantly during the intervening period due to either physical supply issues or water right priority restrictions. Review of available daily diversion records can provide insight and assistance.

Similarly, if alfalfa or hay is cut or annual crops are harvested between coverages, the traditional interpolation approach may "miss" the cutting and over-estimate ET. In areas of the basin where cutting and harvesting dates are uniform, diversion records and irrigation practice information can be used to correct interpolated values.

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