**Development of a Demand Sensitive Drought Index and its Application for Agriculture over the Conterminous United States**

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Abstract:

A new drought index is introduced that explicitly considers both water supply and demand. It can be applied to aggregate demand over a geographical region, or for disaggregated demand related to a specific crop or use. Consequently, it is more directly related than existing indices, to potential drought impacts on different segments of society, and is also suitable to use as an index for drought insurance programs targeted at farmers growing specific crops. An application of the index is presented for the drought characterization at the county level for the aggregate demand of eight major field crops in the conterminous United States. Two resiliency metrics are developed and applied with the drought index time series. In addition, a clustering algorithm is applied to the onset times and severity of the worst historical droughts in each county, to identify the spatial structure of drought, relative to the cropping patterns in each county. The geographic relationship of drought severity, drought recovery relative to duration, and resilience to drought is identified, and related to attributes of precipitation and also cropping intensity, thus distinguishing the relative importance of water supply and demand in determining potential drought outcomes.