

[Estimating Rainfall for Index-based Agricultural Insurance](#) [1]

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Abstract:

Index-based agricultural insurance is a promising alternative for individual farmers who cannot afford traditional insurance based on field inspections for assessing losses. Weather-indexed agricultural insurance, with payouts tied to pre-determined triggers of local indices, requires no field visits, thus significantly reducing costs. To be effective, weather indices need a sufficiently dense network of quality-controlled weather stations. However, in some regions of the world, the number of stations is often limited and located in the main cities and not near farms that are to be insured.

Our study focused on estimating rainfall for areas without rain gauges. For the first phase, we assumed there were no available data from the particular farm to be insured. To obtain daily rainfall estimations for that farm, we applied the neural networks method to interpolate/discover rainfall data, using information from neighboring stations. For the second phase, we assumed there were some limited data available from the farm. To test our method, we used 10 years of rainfall data collected from 21 land-based stations in Iowa, U.S. We started with a small number of stations and systematically increased that number and, thus, the information content of the entire system.

Overall, this study showed an improvement in rainfall estimation, when information content from station data increased. While promising for application to weather-indexed agricultural insurance in some areas, the method used in this study could not help extend insurance coverage to areas too far away from existing stations. Thus, the next step would be to incorporate satellite data to increase the density of rainfall and other measurements. The Global Precipitation Measurement (GPM, launched Feb. 2014) and Soil Moisture Active Passive (SMAP, scheduled to be launched end of 2014) missions will extend the current data records for both measurements into the future, as well as provide improved quality and resolution.

Reference: Albayrak, A. and W. Teng, 2014. Estimating rainfall for index-based agricultural insurance, in Proc. ASPRS 2014 Annual Conference, Louisville.

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