Anomalous precipitation as a factor for the spatio-temporal distribution of RVF in Uganda

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Context

- RVF is an arboviral zoonosis associated with climate anomalies (Davies et al., 1985)
- First RVF outbreak in Uganda recorded in 2016 since 1968 (Shoemaker et al., 2019)
- Multiple outbreaks since 2016 yet no study has systematically analyzed environmental drivers of RVF in Uganda
- The study aims to determine the role of precipitation in RVF outbreaks in Uganda

Innovative ways of working

- Spatio-temporal statistical models for forecasting risk
- Using R software to analyze satellite precipitation data
- CHIRPS (Climate Hazard Infrared Precipitation with Station data)

Research contribution

- Guidance to policy makers on outbreak prediction and cost-effective risk-based control options
- Better human health, animal health & production

Next steps

- Complete analyses of all outbreaks for precipitation, Temp, NDVI, Human and livestock populations

Findings

- **Values close to zero suggest that rainfall estimates are within the expected levels, those <1 indicate below normal precipitation and those >1 are above normal precipitation**
- **Results suggest that RVF outbreaks occur when there is a drastic change from very low <1 precipitation levels to very high >0**
- **It is not just "very high" rainfall events. Otherwise, many of the periods with >0 levels of precipitation would result in an outbreak**

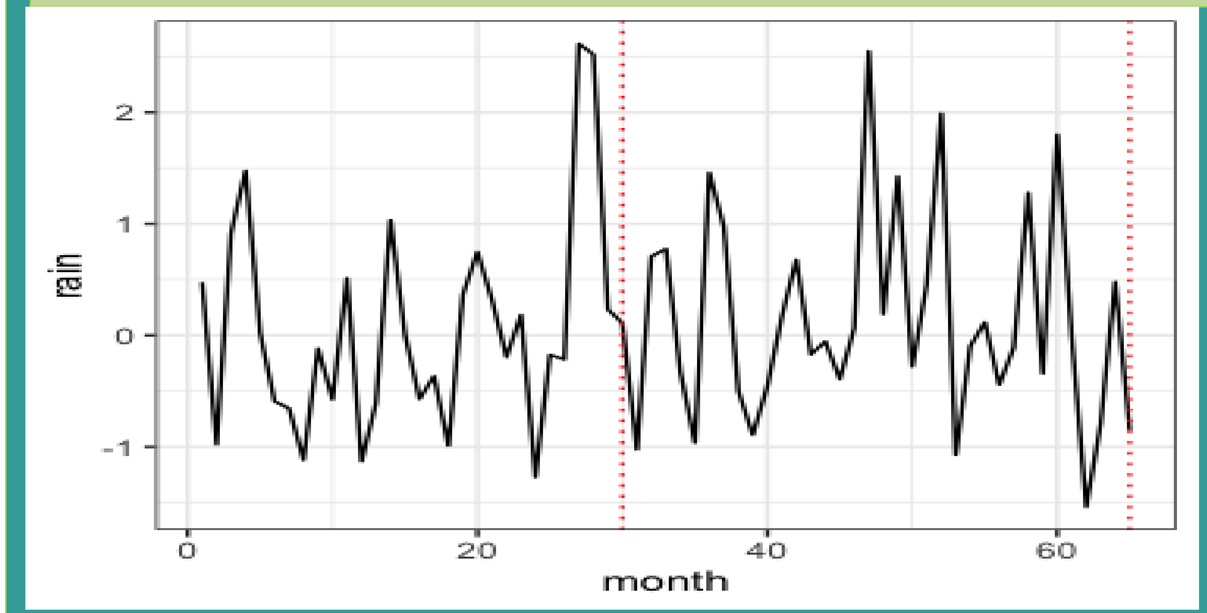

Fig 1: Rainfall anomalies for areas that have reported RVF outbreaks in Uganda between June 2018 and May 2021. The vertical dotted line (in red) identifies periods when outbreaks were reported (June 2018 and May 2021).

References

1. Davies et al., 1985: Rainfall and epizootic Rift Valley fever. Bulletin of the WHO, 63(5), 941-943
2. Shoemaker et al., 2019: doi:10.4269/ajtmh.18-0732

Methodology

- Data source: CHIRPS database, surveillance data (MAAIF)
- Anomalies were calculated by first obtaining mean rainfall values for each month separately using data for the period Jan 1981 to Dec 2015 to analyse all the outbreaks in Uganda since Mar 2016
- Standard deviation for each of the mean values generated above, by month was calculated
- Standardised difference, by month, of rainfall values from January 2016 to May 2021 was obtained

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